Burroughs

B 1000 Series On-Line Data Entry System (ODESY)

INSTALLATION MANUAL

PRICED ITEM

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Burroughs

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INTRODUCTION

This manual describes how to install and maintain the Burroughs B 1000 Series On-Line Data Entry System (ODESY). It provides an overview of the installation process by approaching that process as a series of phases. Additionally, this manual supplies the manager and system operator with information which is critical to the effective operation of ODESY.

ODESY is a sophisticated data entry and verification system which uses multiple on-line terminal display units. ODESY enables you to enter, retrieve, and correct information at the terminal, which increases speed of the data entry process and facilitates the processing of error-free data, and eliminates the complication and inconvenience of a separate data preparation department.

The primary features of ODESY are:

a. On-line data entry, verification, and correction.
b. Application independence.
c. Data entry at source.
d. Inquiry facilities.
e. Operator and data security.

The manual is divided into 10 sections and four appendices. Section 1 provides an overview of the installation process, and lists hardware and software requirements.

Section 2 explains in detail the specifics of installing ODESY.

Section 3 describes the various files associated with ODESY, their initialization and maintenance.

System parameters, the data used to control and restrict general system operations, is contained in Section 4.

Section 5 presents the content and design of the screen formats used by terminal operators to enter data.

An illustrated example is included in Section 6 with a detailed explanation of the program used to create screen formats.

Section 7 highlights the programs used by terminal operators. These programs and the data entry procedure are fully documented in the B 1000 Series On-Line Data Entry System (ODESY) Terminal Operator's Manual, form 1131851.

Section 8 outlines the auxiliary programs which are basically management, conversion, and debugging aids to system operation.

The inquiry facilities available with ODESY and the operation of user programs, including two worked examples, are covered in Section 9.

Section 10 discusses various topics that relate to system maintenance, such as the control of data, security, and the backup and recovery of files.

Appendix A lists the commands used with the Format Maintenance Program, and explains how and when to use each one.

Appendix B contains the input formats used with the File Maintenance and Format Maintenance Programs, and a brief definition of the content of each screen.

A detailed discussion of check digit verification schemes is provided in Appendix C.

Appendix D lists the error and information messages associated with the Format Maintenance Program, and includes an explanation of each.

The style identification of ODESY is B 1000 DE 2.

REFERENCE MATERIALS

This manual is designed to work in conjunction with these manuals:

a. B 1000 Series On-Line Data Entry System (ODESY) Capabilities Manual

b. B 1000 Series On-Line Data Entry System (ODESY) Terminal Operator's Manual, form 1131851.

c. B 1700/B 1800 Systems Network Definition Language (NDL) Reference Manual, form 1073715.

d. B1000 Systems System Software Operation Guide, form 1108982.

e. TD 700/TD 800 Equipment Reference Manual, form 1068699.

f. TD 820 Equipment Reference Manual, form 1085685.

g. TD 730/TD 830 Systems Reference Manual, form 1093788.

h. B 1700/B 1800 Systems Software Release Mark IX.0 Document/SMCS.

i. B 1700/B 1800 Generalized Message Control System (GEMCOS) User's Manual, form 1093499.

SECTION 1. INSTALLATION OVERVIEW

ODESY is a sophisticated on-line data entry system. Various system features help to expedite the installation process.

INSTALLATION PHASES

For convenience the installation process can be broken down into two phases: tasks performed in the days and weeks prior to the actual installation date (termed pre-installation in this manual) and tasks performed as or immediately before the system is brought into "live" operation (installation). Section 2 provides a suggested list of procedures to be performed in each phase of installation.

PRE-INSTALLATION TASKS

Pre-installation is the time during which you should study the system thoroughly and develop a comprehensive installation plan. Complete the training of key personnel and begin training all other personnel affected by the new system. You should complete the ordering of all required hardware, forms, and supplies, configure each terminal to be used with ODESY, and evaluate the impact of the system on existing operating procedures and job responsibilities.

Before operating ODESY, you should determine the basic capabilities and options, and gain familiarity with your hardware as it relates to the operation of this system. Install the data communications software. Determine the information you will need to create formats and design several formats according to the requirements of your business.

INSTALLATION TASKS

All of the previous activities should be completed by the date of installation. Once ODESY is operating, it can be reconfigured easily, so the primary aim at the time of installation is to get one data entry station operating, even if only temporarily, and then to follow the reconfiguration procedures. On implementation day, load the release software onto the system disk. Make any necessary modifications to the standard system configuration distributed with ODESY. Enter and test the formats you designed previously, and begin data entry.

HARDWARE AND SOFTWARE REQUIREMENTS

Listed below are the hardware and software requirements for installation of ODESY. Study these requirements carefully, and then assess your own hardware and software needs; some of these requirements may necessitate additions to or adjustments of your equipment.

HARDWARE REQUIREMENTS

The following is the minimum hardware configuration required:

a. One B 1000 series system mainframe with data communications and at least 20 kilobytes of memory excluding the Master Control Program. This does not include the Network Controller.

b. At least one terminal display unit. These terminal devices are acceptable: TD 700, TD 730, TD 800, TD 820, and TD 830. A terminal which functions as one of these devices is acceptable; a MT 983, for example, may be used instead of a TD 830.

c. One 4.6 megabyte disk drive.

d. One line printer.

SOFTWARE REQUIREMENTS

The following software is required:

a. Master Control Program (MCP), level 9.0 or greater, and related system software.

b. B 1000 series Network Definition Language (NDL), modified to your specifications if necessary. A sample NDL is included with the release.

SECTION 2. INSTALLATION PROCEDURES

This section describes the specific procedures to follow to install ODESY. Installation is divided into two phases: pre-installation tasks and installation tasks.

PRE-INSTALLATION TASKS

The pre-installation tasks are all of the recommended activities which should be completed prior to the date of system implementation.

a. Study the ODESY manuals thoroughly.

b. Attend a demonstration of ODESY. A Burroughs representative can arrange a visit to a site already using the system or can give a personal demonstration of the data entry and format maintenance facilities on any computer with the necessary hardware.

c. Develop an installation plan.

d. Analyze how the new system will affect current operating procedures and job responsibilities. The exact procedural changes, modifications to existing forms, and changes in job responsibilities should be determined and documented.

e. Begin and complete the training of key personnel who will control operation of the programs, monitor data passing through the system, and design and maintain formats.

f. Order and install the necessary hardware.

g. Determine the placement of terminals and cables from the terminals to the computer.

h. Configure each terminal display unit. These field engineer settings are required for the TD 730, TD 820, and TD 830:

   1) Programmatic mode control enabled.
   2) Field overflow inhibit disabled.
   3) Tabulation field identifier disabled.

   These settings are recommended:

   1) Carriage return symbol display disabled.
   2) End-of-text symbol display disabled.

i. Design formats according to Section 5. Initially, to become familiar with the features of ODESY and minimize the effects of errors, choose just one or two applications. Also, it is best to avoid user programs at first; the user program interface is more easily understood once ODESY is operating and familiar.

j. Install the data communications software. This software forms the interface between the ODESY programs and the stations in the network. Refer to the DATA COMMUNICATIONS information later in this section.

INSTALLATION TASKS

These tasks should be performed in the order indicated at the time of installation. These procedures are geared to new users; if you are converting from a previous release, refer to the conversion procedures in the release letter.

a. Copy the software onto a system disk and save the release media for purposes of backup.

b. Get one data entry station operating.

c. Execute the Edit Program. Make any necessary changes to the standard system configuration batch 999. Schedule and extract batch 999. Refer to RECONFIGURATION expanded later in this section.

d. Execute the File Maintenance Program to make the required changes to the Formats, System, and Tank files.

e. Execute the Format Maintenance Program and enter your formats according to Section 6.

f. Test the formats using the Edit Program and the Extraction Program. Application files can be listed and then executed through the application systems. It is important to detect mistakes in record layouts as early as possible.

g. Train all other personnel who are affected by the system.

h. Begin data entry. It is advisable to operate in parallel with existing data entry methods for a short time. Parallel operation normally continues until the formats are stable and produce consistent data. Monitor the results and change the formats to meet the needs of the data entry operators and the application systems.

i. Discontinue parallel operation when the formats have been fully tested.

j. Evaluate results and decide which other applications are to be transferred to ODESY.

DATA COMMUNICATIONS

A B 1000 data communications network is composed of three parts:

a. Network Controller (NC).
b. Message Control System (MCS).
c. Application programs which interface with the MCS.

NETWORK CONTROLLER

The Network Controller, responsible for polling and selecting the stations of the ODESY network, is the heart of the data communications system. The function of the Network Controller is to process and supervise the flow of messages between application programs and the remote network (stations). Before operating ODESY, you must generate a Network Controller using the Network Definition Language. The NDL statements define the stations of the network and the communciations protocols.

MESSAGE CONTROL SYSTEM

A Message Control System (MCS) is responsible for routing messages between stations and programs. The MCS is more powerful than a normal application program and operates closely with the Network Controller as well as with the Master Control Program. Both EDIT and FORMAINT are simple message control systems and are able to handle ODESY when the stations are dedicated to ODESY use only. In this case, the user-written inquiry programs would be thought of as application programs.

However, if you require a more dynamic system, or wish to control certain system functions such as file control and security, the Generalized Message Control System (GEMCOS) or Supervisory Message Control System (SMCS) can be used to generate a more comprehensive MCS. In this case, GEMCOS or SMCS would be thought of as the primary or supervisory MCS, and the ODESY programs EDIT and FORMAINT would be called secondary message control systems. The inquiry programs would be application programs. All information entered from a remote station would go through GEMCOS or SMCS before being passed to EDIT or FORMAINT.

In this manual, "SMCS" refers to the product called SMCS, which is itself a supervisory MCS. The term "supervisory MCS" refers to a primary or supervisory MCS, such as GEMCOS, SMCS, or any other MCS which is supervisory.

Generalized Message Control System

B 1000 GEMCOS may be used to generate a suitable supervisory MCS for ODESY. Complete documentation on B 1000 GEMCOS should be supplied with the software.

Declare remote files in the network as follows:

a. The remote file for the supervisory MCS should contain all of the stations that are to be dynamically allocated at the time of execution.

b. The ODESY remote file should be declared as a dummy file.

In the following example, the supervisory MCS file SUPERQUEUE contains the three stations of the network, and the ODESY file STATIONS and the CANDE file CANDEQUEUE are both dummy files. This network allows any station to either remain under GEMCOS or to dynamically attach itself to ODESY or CANDE. These are sample NDL statements for a small GEMCOS/ODESY/CANDE network:

```
DECLARATION:
     NIF = "SUPER"/"NIF".
     MAX TALLY = [1].
     MAX FILES = 20.
$LIBRARY POLLTCTD
$LIBRARY SELECTCTD
$LIBRARY AUTOPOLCTL
TERMINAL TD802:
     REQUEST = POLLTCTD : RECEIVE, SELECTCTD : TRANSMIT.
     BUFFERSIZE = 2000.
     ADDRESS = 2.
     TRANSMISSION = 0.
     TYPE = 42.
TERMINAL TD832:
     REQUEST = POLLTCTD : RECEIVE, SELECTCTD : TRANSMIT.
     BUFFERSIZE = 2000.
     ADDRESS = 2.
     TRANSMISSION = 0.
     TYPE = 46.
STATION DEFAULT TD8:
     MYUSE = INPUT,OUTPUT.
     RETRY = 5.
     CONTROLLER = FALSE.
     TERMINAL = TD802.
STATION TD800A:
     DEFAULT = TD8.
     ADDRESS = "1B".
STATION TD800B:
     DEFAULT = TD8.
     ADDRESS = "2B".
```

```
STATION TD830A:
     DEFAULT = TD8.
     ADDRESS = "1C".
LINE SLCLINE:
     ADDRESS = 7:14:0.
     AUTOPOLL = 15.
     CONTROL = AUTOPOLCTL.
     STATION = TD800A, TD800B, TD830A.
FILE STATIONS:
     FAMILY = DUMMY.
FILE CANDEQUEUE:
     FAMILY = DUMMY.
FILE SUPERQUEUE:
     FAMILY = ALL.
FINI
```

These Transaction Control Language (TCL) statements must be included:

a. PROGRAMBOJEOJ = TRUE

   This statement ensures that code to support the EX (Execute) and HAP (Halt Application Program) commands is included in the generated MCS.

b.
```
PROGRAM A UTILITY:
     TITLE = ODESY/FORMAINT.
     INTERFACE = MCS.
PROGRAM B UTILITY:
     TITLE = ODESY/EDIT.
     INTERFACE = MCS.
     DETACHMESSAGE = TRUE.
```

   FORMAINT and EDIT must be declared utility programs with a MCS interface, and the detach message option must be set to true for EDIT.

c. Station declarations for all stations in the supervisory MCS remote file.

Other TCL statements will be determined by your specific requirements. These are sample TCL statements for a small GEMCOS/ODESY/CANDE network:

```
CONTROL = GENERATE, LIST, COMPILE.
GLOBAL:
     PROGRAMBOJEOJ = TRUE.
     OBJECTCODEFILENAME = SUPER/MCS.
     SOURCECODEFILENAME = SUPER/MCSSOURCE.
     NCCOKRESPONSE = "****".
     SIGNALCHARACTER = "*".
     MAXTEXTSIZE = 1920.
     MAXRUNNING = 3.
     QUEUENAME = SUPERQUEUE.
```

```
BEGIN
     PROGRAM A UTILITY:
          TITLE = ODESY/FORMAINT.
          INTERFACE = MCS.
     PROGRAM B UTILITY:
          TITLE = ODESY/EDIT.
          INTERFACE = MCS.
          DETACHMESSAGE = TRUE.
     PROGRAM C UTILITY:
          TITLE = CANDE.
          INTERFACE = MCS.
     STATION TD800A:
          SCREENSIZE = 1920.
     STATION TD800B:
          SCREENSIZE = 1920.
     STATIONS TD830A:
          SCREENSIZE = 1920.
END.
```

You must execute the supervisory MCS from the ODT. All of the other programs will be zip-executed as and when they are required.

For the sample TCL statements shown above, enter at the ODT:

```
EX SUPER/MCS
```

As soon as the supervisory MCS is initiated the stations will be attached to it and any valid GEMCOS command may be entered.

The commands used to transfer stations to and from ODESY are EX and HAP. Enter:

```
*EX ODESY/EDIT
```

The station will be attached to EDIT. If EDIT is not already operating, it will be zip-executed.

After this point you may enter standard ODESY commands, such as: /HELLO 1 SUP1 or /STATUS.

The supervisory MCS is non-participating once the station has been attached to ODESY, so response time should not be affected. Only messages preceded by a signal character (*) are processed by the supervisory MCS. To detach the station from EDIT, enter:

```
*HAP ODESY/EDIT
```

Attach it to FORMAINT by entering:

```
*EX ODESY/FORMAINT
```

Or to CANDE by entering:

*EX CANDE

If EXTRACT is to operate concurrently with EDIT and a supervisory MCS, it must be initiated by the ZIP command rather than executed from the ODT. The mix number is that of ODESY/EDIT. Either enter at the ODT:

<mix number>AX ZIP EX ODESY/EXTRACT

or enter at a control station:

/ZIP EX ODESY/EXTRACT

Supervisory Message Control System (SMCS)

When operating ODESY using SMCS, the remote file STATIONS need not be declared in the NDL. SMCS assigns its own remote file to the network.

> NOTE: If the number of remote files to be used at any one time in the network exceeds the number of files declared in the NDL, the MAX FILES statement must be used in the DECLARATION section.

The Network Controller may be specified exactly as shown in the GEMCOS example.

It is recommended that a jobs file be created before any programs are zip-executed from SMCS. The jobs file is simply a data file containing program names and run time attributes for each program. A jobs file will allow ON and OFF commands to be used in attaching stations to and detaching stations from ODESY programs.

To begin system operation enter at the ODT:

EX SMCS

The Network Controller is started up automatically. As soon as SMCS is operating, all stations in the remote file will be attached to it and any valid SMCS command may be entered.

The commands used to transfer stations to and from ODESY are ON and OFF. If EDIT is not already operating, it will be zip-executed when you attach the station to EDIT by entering:

ON ODESY/EDIT

After this point, you may enter standard ODESY commands, such as: /HELLO 1 SUP1 or /STATUS.

To detach the station from EDIT, enter:

```
*OFF ODESY/EDIT
```

To attach a station to FORMAINT, enter:

```
*ON ODESY/FORMAINT
```

The execution of EXTRACT is the same for SMCS as it is for GEMCOS. Refer to the information discussed earlier in this section.

EXECUTING OTHER ON-LINE SYSTEMS

You may wish to execute other on-line packages at the same time as ODESY. Do this in one of two ways, depending on how the network is to operate.

If each station in the network is dedicated to one application, it is necessary only to set up the NDL specifications correctly. For instancein a network which is to execute ODESY and CANDE simultaneously, the ODESY stations should appear in the remote file Stations and the CANDE stations should appear in the remote file Candequeue. Problems occur only when the two remote files have stations in common.

If each station in the network is to be able to select its own application, the network needs to be configured in a different way. The Edit Program is a MCS and packages such as CANDE and GEMCOS are also message control systems. In order to transfer stations between MCS-type programs, it is necessary to use the dynamic attach and detach procedures available to a MCS.

The simplest way to control the network is to use a supervisory MCS. This supervisory MCS will zip-execute the other programs, dynamically attach stations to programs, and generally control the network. It will need a station table, a program table, and a remote file table. It should open a remote file, for example Superqueue, containing all of the stations of the network and the other remote files (Stations, Candequeue, etc.) should be dummy remote files. The supervisory MCS must zip-execute ODESY/EDIT because it needs to know the remote file number associated with the file Stations. The zip-execute results in the supervisory MCS being asked to approve the open of the remote file. The zip-execute can be done in response to a message such as *EX ODESY/EDIT from a station. The supervisory MCS can then attach stations to ODESY. Each station wishing to be attached would send a message such as *ATTACH ODESY/EDIT. When performing the attach, the supervisory MCS should be non-participating and a signal character (for instance *) should be declared, so that event messages such as *DETACH go to the secondary remote file (Superqueue) rather than the primary remote file Stations.

RECONFIGURATION

Reconfiguration is the process of changing the system configuration parameters. It may consist of adding an operator or station, changing the table sizes of the programs, or changing the date type.

Reconfiguration is comprised of three basic steps:

a. Using the Edit Program, enter system maintenance requests into a batch in the Tank file. Batch 999, containing the standard system configuration requests, may be modified or a new batch may be created.

b. Schedule and extract the batch to create a file called ODESYSETUP/INPUT.

c. Process this file using the File Maintenance Program to change the system configuration.

As mentioned, batch 999 contains the standard configuration parameters and may be modified to reflect the desired configuration. The first record of the batch is a CONF maintenance request. You may change the maintenance type from CONI to INIT so that, instead of modifying the existing ODESYDATA files, a new set of files is created. However, if new files are created, the SYS formats and batch 999 will be deleted. (The SYS formats may be reloaded through FORMAINT from the Format Dump file ODESYSETUP/FORDUMP.) It is easier to reconfigure the system if the maintenance type is left as CONI and batch 999 is retained. Use the formats in Appendix B to enter system parameters.

If you plan to reconfigure during installation, decide what is to be changed before executing the programs.

The reconfiguration process is:

a. Execute the Edit Program.

b. Log in at an ODESY station: /HELLO 1 SUP1

c. Open batch 999 in Enter mode: /OPEN 999 ENTER

d. Display each system maintenance request and decide which must be changed: /<record>

e. If a system maintenance request is to be inserted, use the INSERT command to insert the new record after the record specified: /INSERT <record> <format>

   Or use the ENTER command to add a new record to the end of the batch: //<format>

f. If a system maintenance request is to be changed, use the MODIFY command: //<record>

g. If an operator or station is to be deleted, use the MODIFY command to change the maintenance action from I to D.

h. Include a Print All maintenance request at the end of the batch so that the complete system configuration will be printed.

i. Close the batch when all changes have been made: /CLOSE

j. Schedule the batch for extraction: /SCHEDULE 999

k. Remove any previous reconfiguration file from disk, such as ODESYSETUP/INPUT.

l. Execute the Extraction Program.

m. End the Edit Program.

n. Execute the File Maintenance Program.

On the first executions of FORMAINT, EDIT, and EXTRACT after reconfiguration, the programs may dynamically change their memory requirements. If this happens, they will go to end-of-job and then restart automatically.

EXECUTING ODESY

In order to operate ODESY for the first time it is necessary to have one data entry station operating. The standard system configuration provides for one station, which must be the first station declared in the network. This station is specified as logical station number (LSN) 1. It is defined as a TD 802 with braces as forms delimiters. For testing purposes, this definition is compatible with a TD 701, TD 702, and TD 801, providing they use braces as forms delimiters. If you are using brackets as forms delimiters, it is necessary to execute FILEMAINT to change the definition:

```
EX ODESY/FILEMAINT; FILE INPUT NAME ODESYSETUP/BRACKETS
```

If you have TD 730, TD 820, or TD 830 terminals, it is also necessary to execute FILEMAINT, but a different input file is required:

```
EX ODESY/FILEMAINT; FILE INPUT NAME ODESYSETUP/TD820
```

If a new Network Controller is being generated, you should find it easy to match the network to the station provided in the system configuration. However, if this is not possible, the station parameters in the system configuration must be changed to match a station in the network. Do this by executing FILEMAINT with a set of system maintenance requests for station insertions. A "card image" file is required to do this, and it may be created using CANDE, TEXT/EDITOR, or by punching cards and copying them to disk. The card layout is:

COLUMN	DESCRIPTION	VALUES
1-3	Record type	STA
4	Maintenance action	I = insert, D = delete
5-6	Logical station number	Order of the station as defined in the NDL
7-16	Station name	User defined
17-20	Station buffer size	TD 700 = 0256 TD 73X = 0480 TD 801/821 = 0960 TD 802/822/83X = 1920
21	Forms set	A = braces B = brackets C = US, RS
22	Control station	C if permanent control station
23-24	Terminal type	32 = TD 700 33 = TD 730A 34 = TD 730B 41 = TD 801 42 = TD 802 43 = TD 821 44 = TD 822 45 = TD 831 46 = TD 832

You may list the file ODESYDATA/INPUT and inspect the layout of the STA card image. The file created in this way can be processed by FILEMAINT. Input file name represents the card image file. At the ODT enter:

```
EX ODESY/FILEMAINT; FILE INPUT NAME <input file name>
```

The standard system configuration may be printed by entering at the ODT:

```
EX ODESY/FILEMAINT; FILE INPUT NAME ODESYSETUP/PRINT
```

The contents of the Tank file may be printed by executing the PRINT Program. At the ODT enter:

```
EX ODESY/PRINT
```

The report should show one batch, batch 999, which contains data for establishing the standard system configuration.

SECTION 3. FILE MAINTENANCE PROGRAM

The File Maintenance Program (FILEMAINT) is an off-line program which takes a set of system maintenance requests and uses them to update the System file. It may be used to create and initialize the three ODESY master files: the Formats, System, and Tank files. Its main function, however, is to maintain various records in the System file which you may alter. Use FILEMAINT to perform these maintenance operations:

a. Modify system configuration parameters.
b. Insert and delete stations.
c. Insert and delete operators.
d. Modify message texts and commands.
e. Insert and delete check digit verification tables.
f. Print all or part of the System file.
g. Squash the Formats and Tank files.

System file maintenance is required during installation and whenever a change is made to the System file.

MASTER FILES

The System file contains details of operators, stations, check digit schemes, system messages, etc. It is the main source of global information about the system. All ODESY programs access this file.

The Formats file contains the screen formats which are used for data entry. Each format describes the screen layout, audit checks, output record layout, and journal layout. These formats control the processes of data entry and extraction. The file contains one special group of formats, the 14 system parameter formats described in Appendix B, which ODESY uses for the entry of system configuration data. This group is called SYS.

The Tank file contains the batches of data entered. It provides intermediate storage for the data, enabling it to be easily retrieved for display, verification, and modification. The extraction process takes the data from the Tank file and converts it into the form required by the application systems. One special batch is used by ODESY. This is batch 999 and it contains the system maintenance requests that correspond with the standard system configuration.

STANDARD SYSTEM CONFIGURATION

The Formats, System, and Tank files comprise a set of standard files called the standard system configuration. The standard system configuration is the collection of system parameters which allows you to operate ODESY for the first time. Once ODESY is operating, you may tailor the system configuration to suit the needs of your particular business by following the reconfiguration procedures.

The standard system configuration contains defined values for the following:

a. One station, station number 1, terminal type 42 = TD 802, with a screen size of 80 X 24 characters.

b. Eleven operators, five of these supervisors, with these operator numbers and passwords:

1	SUP1
2	SUP2
3	SUP3
4	SUP4
5	SUP5
10	OP10
11	OP11
12	OP12
13	OP13
14	OP14
15	OP15

c. Standard system messages and commands for data entry and format maintenance.

d. Tank file record size of 180 bytes and maximum input size of 160 bytes.

e. Default table sizes for the Edit Program, Format Maintenance Program, and Extraction Program.

f. USA date type, page size of 60, and percent Tank full of 95.

g. Default restrict and include options.

h. Three check digit verification schemes with these scheme numbers:

1) Burroughs Modulus 10/IBM Modulus 10.
2) IBM Modulus 11.
3) Burroughs Modulus 11.

When FILEMAINT is executed, individual maintenance requests are directed to a workfile called ODESYWORK/<job number> and a line is printed in the File Maintenance Report indicating the action requested. The disk directory is searched to ensure that all necessary disk files are present. If they are present and not in use by another ODESY program, file maintenance is performed. If they are present and in use, only print requests are processed.

FILEMAINT performs only a minimal amount of input parameter checking because it is assumed that all maintenance requests have been entered through and checked by the standard formats supplied with the system.

INITIALIZING FILES

Initialization requires the same input formats used for configuration parameters.

For the Formats and Tank files, the files are created, various pointers are initialized, and directories are cleared. Maintenance of the Formats file is handled by the Format Maintenance Program and maintenance of the Tank file is handled by the Edit Program.

The System file also is created and configuration parameters are inserted. However, further maintenance requests for operators, stations, and message texts are required before the System file is usable.

PRINTING FILES

FILEMAINT may be used to print either the entire System file or selected records. Use the PRNT input format, shown in Appendix B, to specify the parameters to be printed.

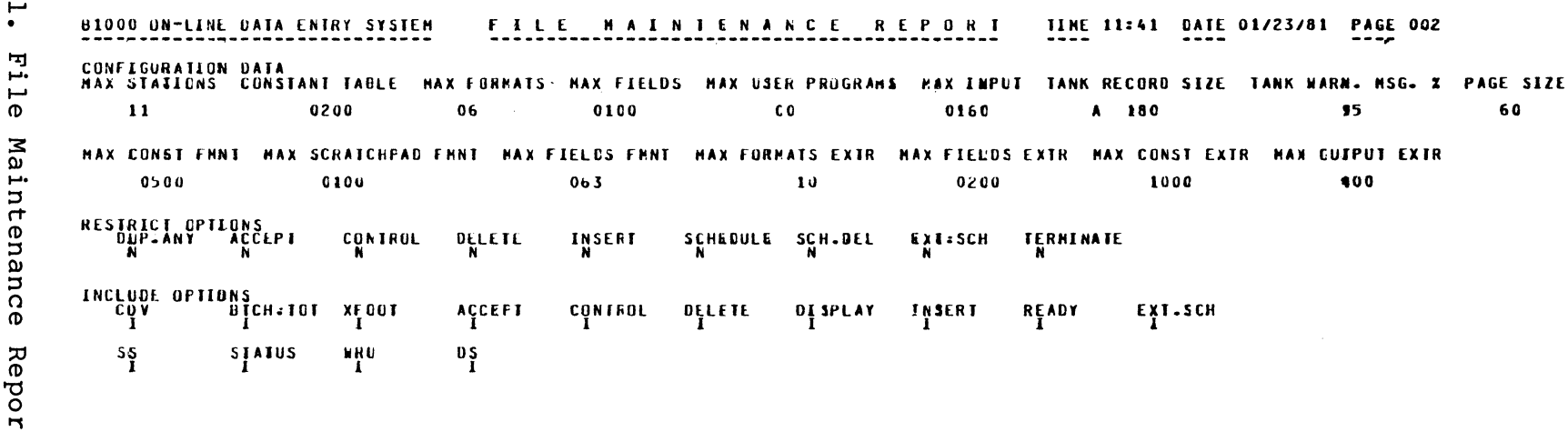
SQUASHING FILES

The Tank file expands in size as data is entered, but it does not automatically contract in size. Operators may delete batches, but this simply creates free records within the existing Tank file; it does not reduce the size of the file. As new data is entered these free records are used before any records are added to the end of the file. However, if the Tank file has already over-expanded, it is necessary to use FILEMAINT to squash the file. This will move all free records to the end of the file and reallocate the space.

Similarly, deleting a format or group of formats from the Formats file creates free records and the file must be squashed when it over-expands.

To squash either the Formats file or Tank file, or both files, complete a SQUA input format. This input data, when extracted, will create an input file which is then processed by FILEMAINT.

Figure 1 shows a sample File Maintenance Report.



B1000 ON-LINE DATA ENTRY SYSTEM F I L E M A I N T E N A N C E R E P O R T TIME 11:41 DATE 01/23/81 PAGE 002

CONFIGURATION DATA

MAX STATIONS	CONSTANT TABLE	MAX FORMATS	MAX FIELDS	MAX USER PROGRAMS	MAX INPUT	TANK RECORD SIZE	TANK WARN. MSG. %	PAGE SIZE
11	0200	06	0100	C0	0160	A 180	95	60

MAX CONST FMNT	MAX SCRATCHPAD FMNT	MAX FIELDS FMNT	MAX FORMATS EXTR	MAX FIELDS EXTR	MAX CONST EXTR	MAX OUTPUT EXTR
0500	0100	063	10	0200	1000	400

RESTRICT OPTIONS

DUP-ANY	ACCEPT	CONTROL	DELETE	INSERT	SCHEDULE	SCH.DEL	EXT:SCH	TERMINATE
N	N	N	N	N	N	N	N	N

INCLUDE OPTIONS

COV	BTCH:TOT	XFOOT	ACCEPT	CONTROL	DELETE	DISPLAY	INSERT	READY	EXT.SCH
I	I	I	I	I	I	I	I	I	I

SS	STATUS	WRU	DS
I	I	I	I

Figure 1. File Maintenance Report

FILE SIZES

The physical characteristics of the standard files supplied with ODESY are:

	Formats	System	Tank
Record length	60	45	180
Records per block	3	4	1
Records per area	300	480	~~200~~ 250
Maximum areas	40	1	100

The size of the System file will accommodate all users, but you may need to increase the sizes of the Tank and Formats files. Do this in one of two ways: either modify ODESY/FILEMAINT and recreate the files or copy the files with larger sizes using DMPALL.

If the file limits are increased by copying the files using DMPALL, the File Maintenance Program should be modified at the same time because squashing the Formats or Tank files, or changing the Tank file record size, creates a new file using the file limits given to FILEMAINT.

For example, to change the limits of the Tank file to 100 areas of 1000 records, modify the File Maintenance Program. At the ODT enter and transmit:

```
MO ODESY/FILEMAINT; FILE TANK BLOCKS,AREA=~~1000~~ AREAS=100
```

When the program has been modified, recreate the files. Note that when the files are recreated, all data in the files is lost and must be completely re-entered.

Alternatively, produce a new file ODESYDATA/TANK with the desired file limits by copying the existing Tank file. Enter and transmit at the ODT:

```
EX DMPALL
```

Then enter and transmit:

```
<mix number>AXPFM DSKDSK ODESYDATA/TANK ODESYDATA/TANK 180
     1 ~~1000~~ 250 100
```

When evaluating file limits for the Formats and Tank files, note the following:

a. For the Tank file, each record entered by an operator occupies one record in the file. There is also one extra record for each batch allocated and another 1Ø3 records for system use. The Tank file needs to be large enough to contain the following number of records:

    1Ø3 + <number of batches> + <number of data records>

b. For the Formats file, there is one record for each field, an extra record for each field with constants, and one record for each format header. There are also 799 records for system use. The Formats file needs to be large enough to contain the following number of records:

    799 + <number of formats> + <number of fields> + <number of fields with constants>

The blocking factor for the Tank file must not be changed because the on-line version of the Extraction Program and the recovery system of the Edit Program depend on unblocked records.

SECTION 4. SYSTEM PARAMETERS

The ability to change the system parameters in ODESY provides a simple means of making alterations to the system as your requirements change. Most of the flexibility in ODESY is due to the fact that information is held on disk as system parameters, not compiled into the programs.

Most of these system parameters are stored in the System file. They include information about operators, stations, system messages, check digit verification schemes, page sizes, dates for reports, and table sizes for programs. These system parameters are changed by the File Maintenance Program discussed in Section 3.

The File Maintenance Program is an off-line program which processes a serial file containing System file maintenance requests. This file can be obtained by using the data entry facilities of ODESY to enter the system parameters through an on-line terminal display unit and then producing a serial file on disk by executing the Extraction Program.

The formats which are used to enter the system parameters are listed in Appendix B. The group name is SYS and the individual format names are shown. Data corresponding to the standard system configuration is in batch 999. This batch contains all of the standard system messages, commands, and check digit verification schemes. To reconfigure the system, enter new data into or modify batch 999, extract the batch, and use the resulting file as input to the File Maintenance Program.

SYSTEM CONFIGURATION PARAMETERS

System configuration parameters consist of parameters for the Edit, Extraction, and Format Maintenance Programs. Most affect only one program, but some system configuration parameters affect several programs.

Date type is used by all programs which print reports. Date type determines whether the date is printed in USA format (MMDDYY), European format (DDMMYY), or International format (YYMMDD). It is also used by the Edit Program to give the system default date type for checks on date fields.

Page size is also used by all programs which print reports. It allows ODESY reports to conform to a particular size of paper.

EDIT CONFIGURATION PARAMETERS

These parameters are used by the Edit Program at the time of execution to determine the sizes of certain tables held in dynamic memory. Dynamic memory means that table sizes are under the control of the program at run time, so it is not necessary to recompile the programs to alter table sizes. Simply change these parameters.

Standard System Configuration Values

The first three parameters, Maximum Formats, Maximum Fields, and Maximum Characters of Constant Data determine the sizes of the format table, field table, and constant table. These values are dependent on each other in this way: if the field table has room for the fields of five formats and the constant table has room for the constants of three formats, it is useless to have more than three entries in the format table, because only three formats can be in memory at a time. As long as the Edit Program has room for at least one format with all of its fields and constants, data entry can continue. However, if this is the case, each new format required must be loaded from disk. With larger table sizes more formats can be held in memory and there is less need to access the disk.

Maximum User Programs controls the number of user programs which may be in execution at a time. If the user program table fills to capacity, ODESY informs the operator so that this parameter can be changed. If there is never more than one user program executing, give the option a value of one. If inquiry facilities are not required, give the option a value of zero.

Maximum Input Size determines the size of the data area allocated to each station for the current data record. Derive this value from the largest input size of any format in the system, as shown in the Format Maintenance Report.

Percentage for Tank File Warning determines the point at which the Edit Program gives a warning that the Tank file is nearly full. The warning is given when the percentage of data records in use is greater than the parameter.

Tank File Record Size controls the length of a record in the Tank file and also controls the largest number of characters accepted from one format during data entry. Three values are possible for Tank File Record Size, but the parameter must be at least 20 bytes larger than the maximum input size. The smallest value, 180 bytes, is suitable for a maximum input size of 160 bytes or less. The size 540 bytes suits a maximum input size of 520 bytes. The largest value is 1080 bytes, allowing space for 1060 bytes of input data. Note that if you change this value the entire Tank file is copied to form a smaller or larger Tank file. If you increase the record size no data is lost, but if

you decrease it any data in excess of the new Tank file size is deleted.

The option also has an effect on the maximum number of stations. A recovery record is written to the Tank file containing information about each station, so more stations may be handled with a larger record size. For instance, if 25 stations were required, the option would have to be set to B, even if 160 characters of input data per format were sufficient.

This table shows the relationships between various values:

Option Setting	Actual Tank Record Size	Maximum Value of Input Data Size	Maximum Number of Stations
A	180 bytes	160 characters	17
B	540 bytes	520 characters	56
C	1080 bytes	1060 characters	115

Response Time Considerations

Response time depends on your particular working environment. In general, high parameter values produce better response time, but use more memory. With low values assigned to system parameters, a program uses less memory, but response time is poorer.

Initially, use the parameters in the standard system configuration distributed with ODESY. If response time is poor, it may be useful to increase the values of the parameters. If response time is good, but you consider memory usage to be too high, decrease the values of the parameters.

To estimate optimum parameter values, consider which formats are likely to be in use at any one time. For example, there may be 10 stations in the network, but most of the time they are used to enter invoicing data requiring three main formats. The Format Maintenance Report shows that these three formats contain 95 fields and 267 characters of constant data. Suppose that there are another six formats which are used less frequently and it would be convenient to have space for three out of the six. This means another 50 fields and another 200 characters of constant data. On this basis, Maximum Formats should be six, Maximum Fields should be 150, and Maximum Characters of Constant Data should be 500. In practice, it is preferable to increase Maximum Formats to eight, allowing a larger number of small formats. As shown, the number of stations is unimportant.

Test this set of values by executing EDIT and measuring response time. Then vary the parameters and assess the differences caused by various values. The critical parameter is Maximum Fields; it has the greatest effect on memory requirements. Determine the other parameters after finding the best value for this option.

FORMAINT CONFIGURATION PARAMETERS

These parameters are used by the Format Maintenance Program at run time to determine the sizes of certain tables held in memory. They are equivalent to the parameters which affect the Edit Program, but have one additional effect which the other parameters do not have. Because all formats are entered using the Format Maintenance Program and because they control the number of fields and constants handled by FORMAINT, they also control the maximum number of fields and constants that can be in any format in the system.

Maximum Fields determines the size of the field table. The Format Maintenance Program only has one format in memory at a time, so this parameter also limits maximum fields per format.

There are two constant tables and two parameters to determine their sizes. The main constant table holds all field names, inserted constants, range check constants, and value check constants for all fields in the format. It provides a limit on the maximum number of characters of constant data per format. The scratchpad constant table is used to hold the constants for each field as it is amended, inserted, or listed. Therefore it provides a limit on the maximum number of characters of constant data per field.

Some constants are needed by the Edit Program but not by the Extraction Program, and vice versa. Some fields, such as output only fields, are needed by the Extraction Program but not by the Edit Program. The table requirements of each format by program are listed in a Format Maintenance Report.

EXTRACT CONFIGURATION PARAMETERS

These parameters are used by the Extraction Program at run time to determine the sizes of certain tables held in memory. They are equivalent to the parameters already discussed in this section for the Edit Program.

The first three parameters, Maximum Formats, Maximum Fields, and Maximum Characters of Constant Data are dependent on each other. They determine the sizes of the format table, field table, and constant table, and they should be derived in the way parameters are determined for EDIT.

The formats held in the tables at any one time belong to one group, so the sizes of the format and field tables probably are smaller than those for EDIT. Determine which formats in each group will be in regular use, and give values to the first two options according to the size of the largest group. Determine the number and size of output only fields used by formats and set the maximum characters of constant data option accordingly. Note that if low values are given to the parameters, more disk must be accessed to load the formats which are not in memory.

Maximum Output Record Size determines the size of the output buffer used to write records to the application file. It can be derived from the record sizes of the files created by ODESY.

DUPLICATE ANY PARAMETER

Duplicate Any is used by the Edit Program to aid in controlling the duplication of data from format to format during data entry. If this option is set, data may be duplicated from the previous format regardless of whether the format name has changed. The default option allows data to be duplicated from the previous format only if the format name is the same.

RESTRICT CONFIGURATION PARAMETERS

The Restrict Options enable certain EDIT commands to be restricted to supervisors, providing greater control over the data entry function. These parameters are used in conjunction with the supervisory status option discussed later in this section.

A command is either restricted to supervisors or is unrestricted and any operator can use it. The commands which may be restricted are ACCEPT, CONTROL, DELETE, EXTENDED SCHEDULE, INSERT, SCHEDULE, and TERMINATE. In addition, you can restrict the delete options of the SCHEDULE command. If the SCHEDULE command is unrestricted, but the schedule delete option is restricted, all operators can schedule batches for extraction but only supervisors can schedule them for deletion.

INCLUDE CONFIGURATION PARAMETERS

The Include Options enable certain ODESY functions and commands to be disabled during data entry, providing additional control over data entry.

The functions which may be excluded are check digit verification, batch totalling, and crossfooting. If a feature is excluded, ODESY ignores any reference to it in a format or command.

The commands which may be excluded are ACCEPT, CONTROL, DELETE, DISPLAY, DS, EXTENDED SCHEDULE, INSERT, SS, STATUS, and WRU. If ACCEPT is excluded, an operator is not allowed to force entry of a record containing errors. If CONTROL is excluded, only permanent control stations and the ODT are allowed to use the TERMINATE and ZIP commands. If SS is excluded, operators are prevented from sending messages to each other.

STATION PARAMETERS

You must define the characteristics of all ODESY stations in the network by entering parameters for each station.

Logical Station Number is the terminal number assigned by the NDL to identify the station. It may be derived from the station section of the NDL listing by the order in which the stations are declared. The first station is number 1, the second station is number 2, etc.

Station Name is for documentation purposes only. It is obtained from the NDL listing.

Station Buffer Size is used by ODESY for data communications purposes. Obtain it from the terminal section of the NDL listing. Forms Set defines whether brackets or braces are to be used as forms delimiters on the TD 700 or TD 800. For the TD 730, TD 820, or TD 830, ODESY uses US and RS as forms delimiters.

Terminal Type is used by ODESY for data communications purposes to control several functions. Obtain this value from the station section of the NDL listing. It is very important that this option be set correctly.

Control Status, when set, gives a station the power to use the CONTROL, TERMINATE, and ZIP commands during data entry.

OPERATOR PARAMETERS

You must define the characteristics of all ODESY operators by entering parameters for each operator.

Operator Number, entered during log-in, identifies the operator and appears in all reports to indicate who is working at a particular station on a particular batch.

Operator Name is for documentation purposes only.

Operator Password, entered during log-in, provides a security check to prevent access by unauthorized operators.

Operator Security Level is another type of security check. It is used whenever a format is requested. ODESY allows use of the format requested when the operator security level is equal to or greater than the format security level.

Operator Type, when set to supervisor status, gives an operator the power to use certain restricted EDIT commands. Use this option in conjunction with the restrict options.

MESSAGE TEXT PARAMETERS

Default message texts used in the system messages for the Edit Program and the Format Maintenance Program are included in the standard system configuration distributed with ODESY. Enter system message parameters only to make changes to the default message texts.

Text Number identifies the system message. Messages numbered 1 through 99 are used by the Edit Program and those numbered 101 through 199 are used by the Format Maintenance Program.

A system message is displayed on the screen in response to input from the operator. Most system messages are 31 characters in length, but several have fewer characters, as stated in the explanation of each message.

The system messages shown in Appendix D pertain to the Format Maintenance Program. Messages pertaining to the Edit Program are documented in the B 1000 Series On-Line Data Entry System (ODESY) Terminal Operator's Manual, form 1131851.

COMMAND PARAMETERS

Only the first three characters of each command used during data entry and format maintenance are recognized by ODESY. Similarly, keywords used to further specify a command are also identified by their first three characters. For instance, while executing the Format Maintenance Program, rather than entering /AMEND FORMAT, it is necessary to enter only:

```
/AME FOR
```

ODESY interprets this input as a request to change a format header.

Default 3-character abbreviations are included in the standard system configuration distributed with ODESY. Enter command parameters only to make changes to the default abbreviations. Note that every field must contain an abbreviation; if you change any abbreviation, all data on that format, either default values or new values, must be transmitted.

No two EDIT or FORMAINT commands may have the same abbreviation; ODESY is unable to distinguish between them.

CHECK DIGIT SCHEME PARAMETERS

Check digit verification, one of the audit check features provided with ODESY, is the process of re-evaluating a check digit and comparing it with the check digit entered. A check digit verification scheme provides a method for converting a number into a self-checking number, called the check digit, by adding an extra digit which is calculated from the other digits in the number. Check digit calculation is the process of calculating the check digit, based on a modulus, a remainder, and a set of weights.

Check digit verification enables you to detect nine of 10 mistakes made with numeric data and is especially useful in detecting the interchange of two consecutive digits. In order to use check digit verification, you must have some method of generating the check digits in the first place. For this reason, check digit verification is most successful with numbers which are used regularly and are relatively stable, such as employee numbers, customer numbers, and account numbers.

ODESY allows you to define a maximum of nine check digit verification schemes. The standard system configuration distributed with ODESY uses schemes 1, 2, and 3. Scheme 1 is defined as Burroughs Modulus 10 (same as IBM Modulus 10), scheme 2 is defined as IBM Modulus 11, and scheme 3 is defined as Burroughs Modulus 11. The parameters used to define the three default schemes are listed in Appendix B.

For a detailed explanation of check digit verification schemes refer to Appendix C.

Scheme Number identifies the check digit scheme. The scheme number must be specified when a field requires a check digit verification check, as shown in Section 5.

Modulus and Remainder are used in the calculation of the check digit. Modulus 10, modulus 11, and modulus 13 are frequently employed.

Calculation Type specifies whether weights or products are to be entered, and if weights are entered it also indicates whether all digits are to be added.

Complemented specifies whether the final product is to be subtracted from the modulus in calculating the check digit.

Weights or products provide a balanced distribution of check digits so that similar numbers will not have the same check digit. ODESY uses a table access method to handle check digits.

It holds products in the tables, so when weights are entered, ODESY calculates the corresponding products. Appendix C shows examples of both weights and products.

PRINT PARAMETERS

Print parameters are used to request printing of all or part of the System file. If an operator is being inserted, or a station is being deleted, or a system message is being changed, the File Maintenance Report shows the effect of the maintenance request, but in order to produce a list of all operators, stations, or system messages it is necessary to enter print parameters.

The most common print parameter is ALL, which produces a listing of the entire system file. The CDV, CMD, OPR, STA, and TXT parameters produce lists of check digit schemes, commands, operators, stations, and system messages. The CON parameter produces a list of all system configuration parameters. The CTL parameter summarizes the data in the control records of the three master files.

A maintenance request to print the entire System file is included with the release. This file is called ODESYSETUP/PRINT and may be used as input to FILEMAINT.

SQUASH PARAMETERS

Squash parameters are used to request squashing of the Formats file and/or the Tank file.

As data records are no longer needed, they are changed into free data records scattered throughout the file, but the disk space allocated to the file is not reduced. For instance, the Tank file may be 10,000 records in length, but of these only 4000 are active data records and the rest are free records. The file is this large because at one time it did contain 10,000 records and though batches have been deleted since that time, the disk space remains allocated. Squashing the Tank file produces a file containing just 4000 records.

In general, the Tank file will require squashing more frequently than the Formats file, because the latter is usually much smaller and the size of the Formats file is likely to be more stable than the size of the Tank file.

A maintenance request to squash both the Formats file and the Tank file is included with the release. This file is called ODESYSETUP/SQUASH and may be used as input to FILEMAINT.

SECTION 5. SCREEN FORMATS

Screen formats are the key to efficient data entry. Data entry is the transcription of data from original documents, normally pre-printed stationery, to a medium suitable for input to a computer. The pre-printed stationery, defined over a period of time, is not easy to change. Similarly, the format of the data supplied to the computer, determined by the application program which processes the information, is very difficult to change. The screen format must satisfy the requirements of both the pre-printed stationery and the application program, and be adapted to the needs of data entry operators.

This section describes the format options available and how they may best be used. Format maintenance, the process of actually entering or changing the format data in the Formats file, is discussed in Section 6.

Each format is made up of a number of fields and each field contains four main types of information. Each field is referenced by a field sequence number during format maintenance which determines its position on the screen. The display options control the screen layout, the audit check options determine which checks are to be applied, the output options determine the application file to be produced, and the journal options describe the printed journal. The display options and the audit check options are used during data entry. The output options and the journal options are used during extraction. The format contains all of the information that the Edit and Extraction Programs require to process a particular record.

Formats are gathered together in groups, and a particular format is referenced by a group name and a format name. Associated with the group name is a set of group header options. These options describe the application file to be produced; in other words, each group of formats creates data for just one application file.

A set of options, known as format header options, is associated with the format name. They are used to describe the features that apply to the format as a whole.

A complete list of format options appears in the second part of Appendix B.

SCREEN LAYOUT

The screen layout is the visual representation of an ODESY screen format. It should be designed with consideration for the operators who will use it. Design the screen layout to be similar to any printed form with which operators are already familiar.

Field Sequence Numbers

Sequence numbers determine the order of fields on the screen and are usually numbered 10, 20, 30, 40, etc., to allow for insertions. Note that column headings and titles appear as name-only fields and require sequence numbers as well.

Field Name

This description or prompt appears to the left of the field during data entry. It may be a maximum of 28 characters in length and is truncated at the right; trailing blanks are omitted to give its actual length. Some fields may have no name and other fields may have a name but no data. The latter are described as name-only fields, and are used as column headings and titles on the screen. If a title is longer than 28 characters, two or more name-only fields are required.

Field Length

Field Length is the length of the field on the screen. Length restrictions are 15 for numeric fields, 16 for signed numeric fields, and 28 for fields with constants. A name-only field has a length of zero.

If Field Type is set to output-only, this field does not appear on the screen. This feature is described later in this section.

Spaces Before/Spaces After/Lines After

Spaces Before, Spaces After, and Lines After are used for horizontal and vertical spacing between fields. The spaces before and spaces after options allow for spacing between the previous field and the field name, and between the field name and the field. If it is not a name-only field, there must be at least one space between the name and the field itself. This space is reserved for highlighting on the TD 730 and TD 830. Note that if secure video highlighting is specified, there must be a minimum of two spaces between the field name and the field. This is to allow a space for the blink character in the event of an error in entry and prevents the secured data from being exposed when the error is returned. Lines After is a field option which allows blank lines between fields.

Highlight

Highlight allows the use of bright video, underline video, reverse video, and secure video on a TD 830 and secure video on a TD 730. If a screen format with highlighting is used on a TD 700, TD 800, or TD 820, ODESY automatically suppresses the highlights.

Duplicate-in

Duplicate-in allows data to be duplicated from screen to screen as long as the format does not change. (A system configuration option, Duplicate Any, may be set to allow data to be duplicated from screen to screen even if the format does change. Refer to Section 4.) The first time a format is required, the duplicate-in fields must be given initial values, but from then on the values are duplicated from record to record. The fields are duplicated as default values so that the operator can easily change them. This feature is different from the duplicate-out and output-only options because the duplication is visible to the operator at all times. Inserted Constant allows an automatic default value to be given to a field. It can be used with the duplicate-in option to give the default value for the first record using the format.

Justify In

Justify In has one important effect on screen layout; when the option is set to R and the terminal is a TD 730, TD 820, or TD 830, the right-justify feature of the terminal is used to automatically justify the data on the screen.

Verify Method

Verify Method allows three alternatives for verification on a field by field basis. The first option is rekey verify; data is re-entered by the operator. The second option is display verify; data for these fields is displayed during verification so that the fields may be visually inspected rather than rekeyed. This feature is particularly useful for long, alphanumeric fields such as names and addresses, where operators may insert spaces or punctuation which leads to verification errors but which has no effect on the accuracy of the data. The third alternative is no verify. This feature can be used only on a TD 730 or TD 830 and is essentially the same as display verify, but the data within the field is transmittable protected. This means that the cursor will not appear within the data field, but will tab past it. This feature is useful if there are display verify fields which the operator does not wish to tab through manually. Note that with this alternative the data within the field may not be altered during verification.

Format Type

Format Type, a format header option, may also have an effect on screen layout. If this value is set to S or U, the user program is requested to supply data for the record being entered, and the data supplied is placed within the format as default data for the operator. Inquiry formats are discussed further in Section 9.

AUDIT CHECKS

Audit checks are the checks performed every time a data record is entered, verified, modified, or inserted (or inquired in Inquiry mode). ODESY offers most of the standard audit checks as options.

Field Type

Field Type allows the specification of four field types. A numeric field may contain only the digits zero through nine. A signed numeric field may contain an optional leading sign, either plus or minus, followed by the digits zero through nine. An alphanumeric field may contain anything. An output-only field does not appear on the screen.

Inserted Constant/Range Check/Value Check

Inserted constant, range check constant, and value check constant all require at least one constant. Only one of the three options may be selected. In each case the first constant is used as a default value and is displayed on the screen.

Range Check applies only to numeric and signed numeric fields. Three constants are required. The first constant is used as a default value and is displayed on the screen, and the second and third constants are the lower and upper limits of the range. The first constant may be blank. The field is in error if the value entered for the field is outside of the range specified.

Value Check may be applied to numeric, signed numeric, or alphanumeric fields. It requires at least one constant. The first constant is used as a default value and is displayed on the screen. It may be blank. If a blank default value is required but blank is not an acceptable value, set the mandatory check option. All constants, including the first, are compared with the value entered for the field and the field is in error if a match is not found. The only limit on the number of constants in a value check list is the size of the scratchpad constant table.

Mandatory Check

Mandatory Check is used to force the entry of data into a field. The field is in error if no data is entered.

Date Check

Date Check allows the checking of 5-digit Julian date fields, or 6-digit date fields of DDMMYY, MMDDYY, or YYMMDD format. The format is determined by the date type option, which is a group header option, so it remains fixed for all of the fields of a particular application file. A date such as February 29, 1981 is detected as an error.

Check Digit Verification

Check Digit Verification (CDV) applies only to unsigned numeric fields and allows check digit verification by a number of schemes. You may define a maximum of nine check digit verification schemes. Three common schemes are included in the standard system configuration distributed with ODESY. Check digit verification schemes are discussed in Appendix C.

Crossfooting

The Crossfooting option (XFOOT) applies only to numeric or signed numeric fields. Crossfooting is a form of subtotalling. Fields within a format can be added to or subtracted from the crossfoot register in such a way that the subtotal balances against the sum of the values for that format. Normally the fields being totalled are added and the total itself is subtracted so that a correct crossfoot register will contain a value of zero. The crossfoot options allow each field to be added to or subtracted from the crossfoot register. When a format which uses crossfooting is transmitted during data entry and the crossfoot register is not zero, an error is returned.

Batch Totalling

The three Batch Total options only apply to numeric or signed numeric fields. Batch totalling is a feature which allows the totalling of numeric data over many records. There are five batch total registers and the batch total option allows each field to be added to or subtracted from a register depending on the sign of the field. If this is a batch header format, the record contains operator-entered batch totals and does not contribute to computed totals. Each field which represents a total must have a batch total register associated with it.

Justify-in

Justify-in may be used to ensure that the data entered is right-justified or left-justified correctly. The right-justify feature of the TD 730, TD 820, and TD 830 is used to automatically right-justify where specified; otherwise the data must be right-justified manually. A justify-out option allows unjustified data to be correctly justified for the output file.

APPLICATION FILE

PHYSICAL CHARACTERISTICS

The physical characteristics of the application file are described by group header options since all formats within a single group produce data for the same file. The physical characteristics of the file must satisfy the requirements of the application system and values can be given to most of these options by referring to the specifications of the application system.

File Name

File Name is the name of the application file produced by ODESY for all batches entered using this group. If a disk file of the same name already exists, ODESY will add records to the end of that file rather than create a new file. The format of the file name varies from disk to tape. Refer to Appendix B for details.

Medium

Medium indicates whether the type of file to be produced is disk or tape.

Record Size/Blocking Factor

Record Size and Blocked (blocking factor) apply to all media. These values should be defined by the application system. Ensure that the maximum output size for the Extraction Program is large enough for all files being produced. Refer to Section 4.

Records per Area/Number of Areas

Records per Area and Number of Areas apply only to disk files. The values may be defined by the application system. Alternatively, the default values are 500 and 40.

Label Type

Label Type applies only to tape files. Refer to Appendix C for details. The default label type, Burroughs standard label, is suitable for most purposes.

RECORD LAYOUT

A record layout which satisfies the application system is usually the final product of ODESY. Find values for most of these options by referring to the specifications for the application system.

Output Position

Output Position defines where the data for the field is to be placed in this record of the application file. The units are bytes and the start of the record is byte 1.

Duplicate-out

Duplicate-out allows data to be duplicated to output records in the application file. For complete details on the use of this option, refer to Write Options and Write Option Examples later in this section.

Justify-out

Justify-out applies to all field types (numeric, signed numeric, alphanumeric, and output-only fields) and it allows data to be justified correctly for output. Right-justification should be performed on all numeric data, either by setting the justify-in option or by setting the justify-out option.

Packed

Packed applies only to numeric and signed numeric fields. It enables numeric data to be converted into 4-bit packed (hexadecimal) storage for output. Because the output position is specified in units of eight bits, the packed-out option allows a packed numeric field to start either at a byte boundary as is usual or four bits later at a half-byte boundary.

The length of the field is derived from the field length option, but it also depends on the field type option, the packed-out option, and the sign convention option. A signed, unpacked, numeric field of length L with an overpunch produces a field of length L minus one bytes in the application file. In all other cases, a field of length L produces a field with an output length of L, that is L digits for packed numeric fields which equals L divided by 2 bytes, or L bytes. L is the value given to the field length option.

Sign Convention

Sign Convention is a group header option. All signed numeric fields within one application file must use the same sign convention. There are four sign conventions. For unpacked numeric fields the sign can be leading or trailing, and it can

be overpunched or a separate character. For packed numeric fields the sign can be leading or trailing, so the third and fourth alternatives default to the first and second. The plus and minus signs are represented by hexadecimal C and D in overpunched signs and packed fields. ODESY expects a leading, or most significant, sign when the data is entered by the operator.

Blank-fill

Blank-fill applies only to numeric and signed numeric fields. For zero-fill, leading blanks are replaced by zeros, but for blank-fill, leading blanks are not replaced. A field is zero-filled by default when data is entered in the field. If no data is entered in a field, it is blank-filled by default.

Sign

The Sign option applies only to signed numeric fields. It represents the default sign of a field. A sign need not be entered in the sign field. If nothing is entered in this field, the default is positive. The sign field will be used only if no sign is entered in the data field during data entry, so an explicit sign entered in a signed numeric data field will always override the default sign field.

Output-only

Output-only fields are a special feature enabling data to be placed in the application file without being viewed by the operator. An output-only field must have an inserted constant, representing the data that is to be placed in the record. None of the audit check options apply to an output-only field and the screen formatting options are ignored because the field is not displayed. However, all output and journal options may be used, and a field name can be entered for printing in the journal.

WRITE OPTIONS

Write options control the writing of records to the application file, enabling you to take advantage of the multiple record features. These features allow you to produce multiple records in the application file from one format or, alternatively, to condense the data from several formats into a single record in the application file.

The multiple record features are implemented in the write-after option and the duplicate-out option, but in order to understand how they work it is necessary to explain how the data in a batch is processed during extraction.

The extraction process uses two record buffers to build up data for the application file. The first one is the output buffer and the second is the duplication buffer. The duplication buffer holds any data that is to be duplicated from record to record and the output buffer contains the data for the current record of the application file. At the start of the extraction of a batch, both buffers are cleared; in other words, blanks are placed in the buffers. The next step is to read the first record of the batch and to load the corresponding format. The data in that record is then processed, one field at a time, in field sequence number order.

For each field in the format, the data is transferred from the batch record to the output buffer and the data is converted if necessary. If the duplicate-out option is set, the data is placed in the output buffer and also in the duplication buffer. If the chained option is set, the data is placed in the output buffer and if the data is not all blank it is also placed in the duplication buffer.

Write-after

Write-after is the last option to be used during extraction before the next field is examined. If the write-after option is not set, no action is taken and the data for the current record remains in the output buffer. However, if the option is set to write-only or write-and-clear, the contents of the output buffer are written as a new record in the application file. For write-only, the output buffer is written and the duplication buffer is copied into the output buffer, causing data to be duplicated into the next record. For write-and-clear, the output buffer is written and both buffers are then cleared, cancelling the effects of duplication.

Write Option Examples

It may be useful to give some examples at this point. The simplest possible example is where each format corresponds with one record of the application file. In this case you only need to set the write-after option of the last field of the format to write-and-clear.

A more complicated example is where each record of the application file is built from three formats. In this case the write-after option of the last field of the third format in the sequence should be set to write-and-clear.

Another example is where one format produces four records in the output file, and each record consists of duplicated data such as record type and date, followed by specific data such as quantity and cost. The duplicated data should appear once in the format and the duplicate-out option should be set for those fields. The specific data should appear four times in the format and,

for the last field of each set of specific data, the write-after option should be set to write-only. Write-and-clear can be used for the final field of the format if the buffers are to be cleared.

The final example is where one format produces four records in the output file and each record consists of an account number, which may either be duplicated from record to record or changed at any time, followed by specific data such as quantity and cost. This use of the duplicate-out feature may be referred to as a "chained" field. The chained field should appear four times in the format, each time being specified as chained and followed by the specific data fields for the record. Whenever an account number is entered in the chained field, it will be placed in the duplication buffer and duplicated in the output record until the next account number (next non-blank entry) is entered in a succeeding chained field. For the last field of each set of data, the write-after option should be set to write-only. Write-and-clear can be used for the final field of the format if the buffers are to be cleared.

The example above provides a very efficient way of entering data with ODESY. The amount of data entered by the operator is reduced because the duplicated data is entered once. The overall transmission time is reduced because there is more data in each ODESY record and therefore fewer records.

Write-after can also be set to "save." Refer to the third example. This format produces four records in the application file each time it is used. However, if the operator only has data for two records, ODESY does not produce two good records followed by two records containing only the duplicated data and blanks for the specific data. The output buffer is not written if only blanks have been processed since the last write. The data in the duplication buffer does not count, so only two records are written.

However, if each of the sets of specific data contains an inserted constant, such as "1," "2," "3," or "4" to identify each of the four records, ODESY is not processing blanks, and four records are written. The problem may be overcome by setting the write-after option to save for each of the inserted constant fields. This causes all data since the last write to be treated as blanks when determining whether to write a record. The third and fourth records are written if data is entered after the inserted constants. The save feature is not used very often.

JOURNAL LAYOUT

The journal is an optional feature. It is produced by the Extraction Program at the same time the application file is produced and is an audit trail of the data extracted. The Extraction Program also prints an Extraction Report, summarizing the batches processed and containing a single line for each batch.

The layout of the journal is under your control. It can contain one or more lines for each batch record and the data printed can be all fields or only selected fields.

Journal

Journal is a group header option and it must be set if a journal is required.

Name Column

Name Column indicates where the field name is to be printed on the print line, from column 1 through column 132. If nothing is entered for the name column option, the field name is not printed in the journal. This option is not dependent on the data column option.

Data Column

Data Column indicates where the data is to be printed on the print line. The first column is column 1 and the end of the line is column 132. If nothing is entered for the data column option, the field is not printed in the journal.

Print-after

Print-after corresponds with the write-after option. For most purposes it is sufficient to set the option to print-and-clear whenever a complete print line has been assembled, but the same facilities available for writing are available for printing, so you may utilize duplicate-out, print-only, and save.

Journal Input Record Number/Journal Output Record Number

Journal Input Record Number and Journal Output Record Number enable you to relate the printed journal to the records in the ODESY batch and application file. They are group header options and if one or both of the options is required, the number entered indicates a column number in the journal. The input record number is the number of the record in the ODESY batch and, if this option is selected, the corresponding input record number is printed on every line of the journal. Similarly, the output record number is the number of the record in the

application file. If you use these options, do not print other data in the columns for record numbers.

Journal

If Journal has been set, you can decide at the time of execution whether to produce an application file, a journal, or both. The Extraction Program provides the options of a journal-only execution or a no-journal execution in addition to the standard execution which produces both journals and application files. A journal-only execution would enable you to verify that the correct data was being extracted before producing the application files.

FORMAT HEADER OPTIONS

The remaining options are format header options.

Next Format

Next Format provides an automatic sequence of formats. Often the next format is the same as the format name.

Security Level

Security Level is used to give a security level from Ø through 99 to the format. It is checked against the operator's security level whenever the format is requested during data entry. The operator is refused access to the format if the operator security level is less than the format security level.

No Verify

No Verify is used when a format contains data which does not need to be verified. If a no-verify format is requested, a record is marked as verified as soon as it is entered, so it does not count as an unverified record when the batch is closed.

Line Advance

Line Advance allows blank lines between the control line information and the first field.

Cursor Advance

Cursor Advance allows the cursor to be positioned beyond the first field during data entry. For instance, if the inserted constant and duplicate-in options are used to give default data to the first five fields, this option can be set to 5 so that the cursor is automatically placed in the sixth field. Name-only fields and output-only fields are not counted when calculating how far to advance the cursor.

Inquiry Format Type

If audit checks are required which cannot be specified by other options, they may be performed by a user program. If Inquiry Format Type is set to C or U, the data entered is sent to the user program for further checking. Inquiry formats are discussed in Section 9.

SPECIAL FORMATS

ODESY uses two sets of special formats and they are shown in Appendix B.

The formats for the File Maintenance Program have group name SYS and have format names CONF through SQUA. They are used in batch 999, which contains the current ODESY configuration. System parameters are described in Section 4.

The formats for the Format Maintenance Program are contained within the program and are not changeable. They are used during format maintenance to describe the format data being entered. Included are two group header screens, one format header screen, three field details screens, and one screen for each of the field check options: constant, range, and value. Two sets of formats exist; one for the TD 700, and one for the TD 730, TD 800, TD 820, and TD 830. The correct set of formats for the terminal is handled automatically by the program. Format maintenance is discussed in Section 6.

DESIGNING A FORMAT

To translate a file and record description into an ODESY format, use the Field Screen Layout/Audit and Output Specifications Form contained at the end of Appendix B.

First obtain the file specification and record layout to establish required output.

Second, decide what is to appear on the screen. For instance, should the format be designed to produce several output records? Are there to be fields which appear in the output record but not on the screen?

Third, design the basic screen layout using an 80-column coding form to sketch your preliminary format.

Fourth, fill in the group header and format header options.

Fifth, transcribe the information from the screen layout to the form. First of all the fields must be numbered, usually in increments of 10. Then the field name, field length, spaces before, spaces after, and lines after options can be filled in directly from the screen layout.

Sixth, fill in the audit checks. Most of the audit checks can be derived from the file description and record layout, but it is possible to find other checks. In particular, the inserted constant, mandatory, crossfoot, and justify-in options may be used to provide additional checks. It is preferable to have ODESY find errors in the data as opposed to waiting until the application system detects them, so specify as many audit checks as possible.

Seventh, obtain the output options from the file description and record layout.

Eighth, fill in the journal options. To obtain this information:

a. Decide what is to be in the journal.
b. Design the journal layout and write it down.
c. Transcribe the information onto the form.

Ninth, execute the Format Maintenance Program and enter the data as a new format.

SECTION 6. FORMAT MAINTENANCE PROGRAM

The Format Maintenance Program (FORMAINT) is an on-line interactive program which enables you to create screen formats and make changes to existing formats in the Formats file from an ODESY station. Section 5 describes the format options available and this section shows how those options may be manipulated.

Format data is entered under the control of a special group of screen formats contained in the program. The formats for format maintenance are shown in the second part of Appendix B. These special formats allow you to create a complete format in the workarea, starting with the group header and format header, and continuing with the individual fields and constants. The format data is checked for errors as it is transmitted, in the same way data is checked in the Edit Program. When the complete format has been entered, it is stored in the Formats file and you may begin work on another format.

FORMAINT allows existing formats to be amended or edited for new applications. This facility gives you great flexibility because, unlike a printed form, a screen format can be changed quickly whenever necessary. Also, you may display the format as it would appear for data entry before storing it in the Formats file, allowing you to make minor changes to the alignment of fields on the screen.

For reasons of security, no more than one person may enter format data at a time. You may execute FORMAINT while data is being entered or extracted; however, there are restrictions on how the Formats file may be accessed if these programs are executing.

Format maintenance is controlled by a set of commands which have been carefully designed to make use of the system as easy as possible and are similar to the data entry commands. These commands are discussed throughout the text and it may be useful to refer to Appendix A, which contains the syntax and semantics of the commands.

Appendix D contains a list of error and information messages pertaining to the Format Maintenance Program. An explanation is included with the number and standard text of each message.

FORMATS FILE AND FORMAT WORKAREA

Format maintenance uses both the Formats file and the format workarea. Formats are stored for use by other ODESY programs in the Formats file. The file contains a directory of group names. The maximum number of groups is 196, but there is no limit on

the number of formats in each group. The total number of formats in the Formats file is limited only by the size of the file, which is 12000 records by default.

The format workarea is a temporary storage area. It enables you to change a format without affecting the permanent copy in the Formats file. The format workarea can contain one complete format at a time, consisting of a group header, a format header, and all the fields and constants of that format. The number of fields and constants in the workarea is limited by the sizes of the field and constant tables (refer to Section 4).

The first step in format maintenance, as in data entry, is to log in using the HELLO command with your operator number and password.

CREATING A FORMAT

A new format is created in the workarea.

ENTERING FORMAT DATA

Use the INSERT command to enter a new group header, format header, or field. ODESY progresses automatically from group header to format header to first, second, and all following fields, and as each is entered it is placed in the workarea.

Group Header Data

If the command parameter is omitted, ODESY responds by displaying the first group header format, Group Header 1. At this point, enter all of the group header format data for the first format and press the transmit key (XMT).

ODESY does not check the data of a format until it has been transmitted. If it finds any errors, the format is redisplayed with question marks in the fields in error. Now you must re-enter the erroneous fields and re-transmit all of the data. It is not possible to complete the entry of a group header, format header, or field which contains errors. If the error is not immediately obvious, it may be due to an error elsewhere; for instance, a range check on a non-numeric field. Appendix B and Section 5 contain advice on the relationships between format options.

If the data for format Group Header 1 has been entered correctly, ODESY automatically displays format Group Header 2 for the entry of the other group header options. Now enter this data.

Format Header Data

If there are no errors in the data for Group Header 2, ODESY displays Format Header for the entry of the format header data. Enter format header data in the same way you entered group header data. If there are no errors in the data for Format Header, the format header data is placed in the workarea and the first field format, Field Details 1, is automatically displayed.

Field Data

There are three main field formats: Field Details 1, Field Details 2, and Field Details 3. Field Details 1 contains mainly display options, Field Details 2 contains audit check options, and Field Details 3 contains output and journal options. The formats normally appear in the order Field Details 1, Field Details 2, and Field Details 3, with Field Details 3 followed by Field Details 1 for the next field. However the order can be changed when certain field options are selected. For instance, if the field length (Field Details 1) is set to zero for a name-only field, Field Details 2 is omitted since there can be no audit checks. Similarly, if an inserted constant, range check constant, or value check constant is selected (Field Details 2), one of the constant formats follows Field Details 3.

Inserted, Range Check, and Value Check Constants

The Inserted Constant format allows the entry of one inserted constant and is followed by Field Details 1 for the next field. Similarly Range Check Constants allows the entry of three range check constants (default value, lower limit, and upper limit) and is followed by Field Details 1. However Value Check Constants, which allows the entry of a maximum of five value check constants, may be followed by either Value Check Constants again or by Field Details 1, depending on the number of constants entered. If five constants are entered, Value Check Constants appears again for the entry of further constants, but if four or less are entered this is considered to be the end of the constants and Field Details 1 is displayed. If exactly five constants are to be entered, leave Value Check Constants blank the second time, to indicate the end of the constants.

When all of the fields of the format have been entered, the automatic sequence of formats from Field Details 1 to Field Details 2 to Field Details 3 and back to Field Details 1 may be broken by entering another command. As with data entry, ODESY distinguishes it as a command by the slash character (/).

A field is not placed in the workarea until all of the format options for that field have been entered correctly. ODESY indicates this by displaying Field Details 1 again for the next field. For instance, assume you are entering a field with a range check and a set of invalid range check constants are

entered. ODESY again displays format Range Check Constants, indicating the errors. If you ignore the errors and enter another command, all data for the current field is lost and must be re-entered, beginning with Field Details 1.

DISPLAYING OR LISTING A FORMAT

If you wish to look at the format before saving it, you can display the format in the workarea on the screen as it would appear for data entry.

The DISPLAY command has no parameters. It always displays the current contents of the workarea as the format would appear for data entry. Output-only fields are not shown. This command is useful for inspecting the alignment of fields and field names on the screen. Changes to alignment can be made with the AMEND command.

Use the LIST command to inspect the individual format options of the data in the workarea. The syntax of the command is the same as that of the INSERT command, and ODESY uses the Group Header Data formats for presenting the data. You may list the workarea, beginning with the group header, format header, or a particular field. Request the next "page" of the listing by pressing the transmit key. The group header automatically progresses to the format header, the first field, the second field, and so on. Break the sequence by entering another command.

SAVING A FORMAT

A format is not available for data entry until it is placed in the Formats file. Use the SAVE command to transfer the current contents of the workarea to the Formats file, and to update the group and format directories in the file. The command has no parameters.

ODESY keeps a record of what is in the workarea and what has been changed. For instance, if the format header or one of the fields has been amended, the format is "present and changed," but the group header is "present and unchanged." So when the SAVE command is used, the format is updated but the group header is not. Similarly, if the operator attempts to use the INSERT command to enter a new group or format while there is changed data in the workarea, ODESY asks the operator to save or delete the format.

The SAVE command makes permanent changes to the Formats file. Format maintenance, data entry, and extraction may take place at the same time. However, if a format is changed while it is being used for data entry there is a danger of data corruption. ODESY avoids this potential problem by not allowing format data to be saved while other programs are using the Formats file.

You must temporarily store unsaved data by dumping it from the workarea to a Format Dump file. When data entry or extraction is complete the Dump file can be loaded to the Formats file.

CHANGING A FORMAT

Use the GET command to transfer a group header or a group header and format from the Formats file to the workarea. The GET command has two parameters, indicating the group name and format name. If the format name is omitted, only the group header is placed in the workarea.

Various editing facilities enable you to manipulate the data in the format workarea. You may make changes to existing fields in the format (amendments), add missing fields to the format (insertions), and delete unwanted fields from the format (deletions).

Other editing facilities enable you to reorganize the screen layout by rearranging the order of the fields. Additionally, the COPY command allows a new format to be built up in the workarea by duplicating fields from an existing format.

AMENDING FIELDS

Use the AMEND command to change individual format options of the data in the workarea. It has the same syntax as the INSERT command and the LIST command, and ODESY uses the same special formats (Group Header 1, Group Header 2, etc.) for presenting the data.

If you enter the AMEND command followed by a field sequence number, ODESY responds by displaying the format Field Details 1, containing the data for the field requested. You may now change the field options displayed. Indicate completion by pressing the CLEAR HOME key and transmitting. If there are no changes, just press the transmit key. In either case, the next format, Field Details 2, is displayed with further field options, which you may change.

The AMEND command progresses automatically from one field to the next. The sequence is terminated by entering a new command. Be careful when amending a field that all of the format options for that field have been properly processed before entering a new command, because the amended field is not added to the workarea until ODESY has a complete set of format options for the field. ODESY indicates it has finished by displaying Field Details 1 again for the next field.

In general, you amend a format header and group header in the same way, but a group header does not automatically progress to the format header.

DELETING FIELDS

Use the DELETE command to delete unwanted data from the format workarea. You may delete either a single field or the entire workarea. You must delete unwanted data from the workarea before further format maintenance can continue.

RESEQUENCING FIELDS

Use the RESEQUENCE command to reallocate sequence numbers to all of the fields of the format in the workarea. Specify the first new sequence number and the new increment. After resequencing, the fields remain in the same order, but are separated uniformally. This command is useful when a format has been reorganized or when there are no spare sequence numbers.

MOVING FIELDS

Use the MOVE command to transfer a particular field or range of fields to a new position on the screen by changing the sequence numbers. The screen layout is determined by the order of sequence numbers in the fields, so moving a field alters its position on the screen.

DUPLICATING FIELDS

Use the COPY command to duplicate a field or range of fields and place the copy at a new position in the format. The COPY command is particularly useful when a format is to produce multiple records in the application file. Some fields in the format will be identical; enter such fields once and then use the COPY command.

The COPY command can also be used to copy fields from existing formats in the Formats file. A set of fields which are common to several formats can be created once and copied. An extension of this is the case in which several groups have a format in common, for instance a batch header format. You need only to create the format once and copy all the fields for the other groups.

The MOVE command and the COPY command are used to reorganize the screen layout of a format. The difference between moving a field and copying a field is that a copy results in two fields, an original and a duplicate, and a move results in only one field, moved to a different location.

ADDING A FORMAT TO A GROUP

The INSERT command may also be used to add a new format to an existing group. To do this, obtain the group header from the Formats file using the GET command and then the INSERT command with the FORMAT parameter to begin entry of the format header.

A new field may be inserted into an existing format in a similar manner. Obtain the group header and format from the Formats file using the GET command. Then enter the INSERT command followed by a field sequence number.

REMOVING A FORMAT

Use the REMOVE command to remove a group or format from the Formats file. It has two parameters, indicating the group name and format name. If the format name is included, only that format is removed. If the format name is omitted, the entire group is removed from the file. The REMOVE command cannot be used if the Formats file is in use by another program, for instance by the Edit Program or the Extraction Program.

The last step in format maintenance, as in data entry, is to log out using the BYE command.

PRINTING A FORMAT

A Format Maintenance Report shows details of a format and its screen layout. Using the PRINT command, you may request a printed report of a single format, all the formats in a particular group, the entire Formats file, or the format in the workarea.

The report for a specific format consists of six parts:

a. Group header options.
b. Format header options.
c. Screen layout.
d. Display options.
e. Audit check, output, and journal options.
f. Summary totals.

Group header options, format header options, display options, and audit check, output, and journal options correspond with the input formats in Appendix B. The screen layout is a representation of how the format appears during data entry. The size of the screen may affect the appearance of the format. The screen size used in the report, either 80 X 24, 80 X 12, 40 X 12, or 32 X 8, matches the screen size of the ODESY station requesting the report. The summary totals indicate how many fields and constants are used by the format. They are used to compute the memory requirements of the Edit and Extraction Programs.

Use the PRINT DIRECTORY command (PD) to request a printed directory of all format names in a particular group or of all group names in the Formats file. This command is helpful in checking that a particular format or group is in the Formats file.

```
B1000 ON-LINE DATA ENTRY SYSTEM        F O R M A T   M A I N T E N A N C E   R E P O R T   TIME 11:26  DATE 01/23/81  PAGE   1
   GROUP NAME  SYS                              FILE NAME          ODESYSETUP/INPUT    DATE LAST CHANGED 01/23/81

   RECORD SIZE  80  BLOCKED  9   RECORDS/AREA  450   AREAS 40   ON DISK                          REPORT  DATE FORMAT  AS SYS
   GROUP SIGN CONVENTION     MSD

   FORMAT NAME SYS STA            NEXT FORMAT SYS STA     SECURITY  90       VERIFY            DATE LAST CHANGED 01/23/81
                                  LINE ADVANCE 0          CURSOR ADVANCE  0

                    ****************************************************************************
                    *  000 0000 STA        [ ]STA ]                                             *
                    *MAINTENANCE ACTION:I,D       [ ]                                          *
                    *LOGICAL STATION NUMBER      [  ]                                         *
                    *STATION NAME         [          ]                                        *
                    *STATICA BUFFER SIZE       [1920]                                         *
                    *FORMS SET:A,B,C             [C]                                          *
                    *TERMINAL TYPE               [46]                                         *
                    *CONTROL STATUS: ,C           [ ]                                         *
                    *                                                                        *
                    *                                                                        *
                    *                                                                        *
                    *                                                                        *
                    *                                                                        *
                    *                                                                        *
                    *                                                                        *
                    *                                                                        *
                    *                                                                        *
                    *                                                                        *
                    *                                                                        *
                    *                                                                        *
                    ****************************************************************************

DISPLAY SPECIFICATIONS
SEQ        NAME                          LENGTH  SPACE BEFORE/AFTER  ADVANCE LINE  HIGHLIGHT  DUP IN  DISP VER
 10                                          3       0     1            0
 20  MAINTENANCE ACTION:I,D                  1       0     6            1
 30  LOGICAL STATION NUMBER                  2       0     5            1
 40  STATION NAME                           10       0     7            1
 50  STATION BUFFER SIZE                     4       0     6            1
 60  FORMS SET:A,B,C                         1       0    13            1
 70  TERMINAL TYPE                           2       0    14            1
 80  CONTROL STATUS: ,C                      1       0    10            0

B1000 ON-LINE DATA ENTRY SYSTEM        F O R M A T   M A I N T E N A N C E   R E P O R T   TIME 11:26  DATE 01/23/81  PAGE   2

OTHER SPECIFICATIONS
SEQ  TYPE  CNS/VAL/RANGE  MAND  DATE  CDV  CROSSFOOT  BATCH TOTALS  JUST IN  OUT POSN  WRITE AFTER  DUP OUT  JUST OUT  PACK OUT  BLANK FILL  SIGN  NAME COL  DATA COL  PRINT AFTER
 10   U       C
                      CONSTANTS   STA                                                1                                                          1
 20   AN      V
                      CONSTANTS   1 D                                                4                                                          5
 30   UN      R
                      CONSTANTS     01 99                                            5                      R                    10          40
 40   AN                                                                            7                      L                    47          69
 50   UN      R
                      CONSTANTS   1920 0010 4095                                    17                     R                    84          112       C
 60   AN      V
                      CONSTANTS   C A B                                             21                                          10          41
 70   UN      R
                      CONSTANTS   46 32 46                                          23                     R                    47          77
 80   AN      V
                      CONSTANTS     C                                               22          C                              84          115       C

**** TOTALS ****        FIELDS INPUT          8          FIELDS OUTPUT                    8
                        INPUT DATA SIZE      21          CHARACTERS OF CONSTANT DATA     34
                        OUTPUT DATA SIZE     24          CONSTANTS REQUIRED BY EXTRACT    3
                        FIELDS PRINTED       14          MINIMUM SCREEN SIZE OF FORMAT 8 BY 32
```

Figure 2. Format Maintenance Report

Figure 2 shows a sample Format Maintenance Report.

FORMAT DUMP FILES

A Format Dump file is a serial file containing format data. It is normally used as a temporary or intermediate file. It is very different from the Formats file. It has three main uses:

a. Temporary storage for formats, for instance when the Formats file is in use by another program.

b. Format conversion aid.

c. Library file.

There can be many Format Dump files, but only one Formats file. A Dump file is accessed during format maintenance by the DUMP command and the LOAD command.

The DUMP command transfers format data from the Formats file or the format workarea to a Format Dump file. You can dump the entire Formats file, a specific format, or a group of formats. Refer to the Dump file by name. If the file already exists, format data is added to the end of the file. If it does not exist, a new file is created.

Because new format data is added to the end of an existing Dump file, it is possible to have several copies of the same format in a single file. Although this wastes disk space, it should not result in errors. When ODESY loads the format data again, each copy of the format is loaded in turn, over-writing the previous copy. Only the last copy of the format remains in the Formats file after the LOAD command is complete.

The LOAD command transfers format data from a Format Dump file to the Formats file or the format workarea. You can load the entire Dump file, a specific format, or a group of formats. When loading to the workarea, you may load only a single format. Refer to the Format Dump file by name.

There are three format maintenance commands which cannot be used while the Formats file is in use for data entry or extraction. These are the LOAD, REMOVE, and SAVE commands. ODESY refuses to perform these actions if the file is in use by another program.

However, ODESY does provide a solution to the problem of saving the format in the workarea so that work may continue on another format: use the DUMP command to temporarily dump the workarea to the Dump file. The contents of the Dump file can be loaded to the Formats file with one command when data entry and extraction are inactive.

The Formats file is a structured file of format data with directories and forward and backward pointers to the records of the file. A Format Dump file is a simple serial file of format

data with no internal structure. Due to this simplicity of structure, the Dump file is used to carry format data from a Formats file used by a previous release of B 1000 ODESY (small systems ODESY) to the Dumpfile Conversion Program, provided with the latest small systems ODESY release, where it can be converted for use with the newer release. This may be necessitated by a change in the structure of the Formats file between the old and new releases. This eliminates the need to re-enter all of the format data.

Another use of the Dump file is to carry format data between small systems ODESY and medium systems ODESY. A medium systems ODESY format is different from a small systems format, so to use a format on both systems it is necessary to go through a conversion procedure. This is done by the Dump File Conversion Program supplied with the medium systems ODESY release and, as the name implies, it converts the format data in a Dump file. It is normally a once-only change to convert formats from another system. The medium systems ODESY Dump File Conversion Program converts a small systems Dump file to a medium systems Dump file.

A Format Dump file can also be used as a library file. It can store old, seldom-used, and alternative versions of formats. Also, if two different sites, each with its own computer, are executing ODESY, Dump files provide a means of carrying common formats between the two sites. The alternative is to copy the entire Formats file.

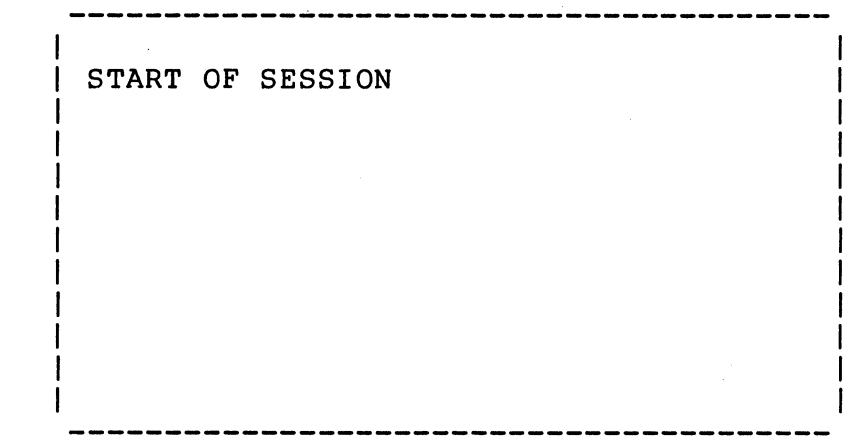
FORMAT MAINTENANCE EXAMPLE

This example illustrates the main features of format maintenance. The instruction "enter" is used to mean "type in and transmit."

First, as in data entry, log in using the HELLO command.

Enter: /HELLO 1 SUP1

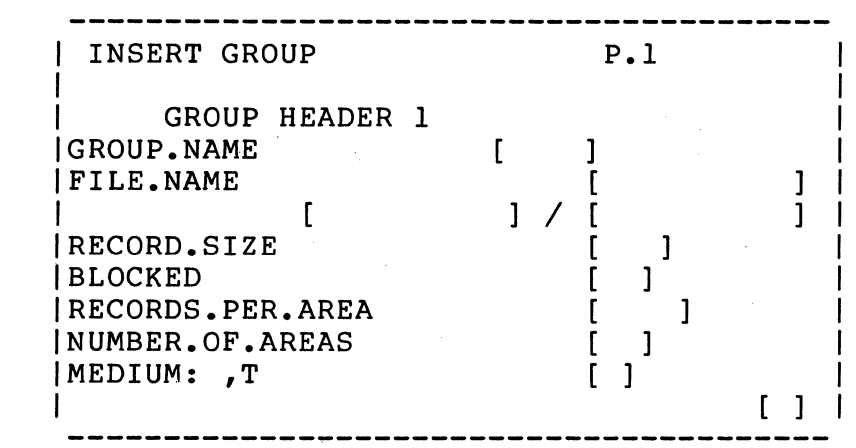
If your log-in entry is valid, ODESY replies:



Suppose you are to enter a new format, with group name INV and format name T1. First enter the group header details.

Enter: /INSERT

ODESY replies:



The first line contains control information, such as the current command (INSERT) and the item being maintained (Group Header).

Enter the following group header data:

```
 INSERT GROUP                P.1
|
|     GROUP HEADER 1
|GROUP.NAME             [INV ]
|FILE.NAME                   [          ]
|            [INVØ1     ] / [          ]
|RECORD.SIZE                 [8Ø ]
|BLOCKED                     [9 ]
|RECORDS.PER.AREA            [9Ø  ]
|NUMBER.OF.AREAS             [99]
|MEDIUM: ,T                  [ ]
|                                    [ ]
```

There are no errors and ODESY replies with the second group header format. Enter nothing here because the default values are sufficient. Note that ODESY has established that the group name is INV and has placed it in the control line.

```
 INSERT GROUP  INV           P.2
|
|     GROUP HEADER 2
|
|RECORDING.MODE: ,A,B                [ ]
|LABEL.TYPE: ,A,U                    [ ]
|DATE.FORMAT: ,E,U,I,J               [ ]
|SIGN.CONVENTION: ,1,2,3             [ ]
|JOURNAL: ,J                         [ ]
|JOURNAL.INPUT.REC.NO                [   ]
|JOURNAL.OUTPUT.REC.NO               [   ]
|                                      [ ]
```

The group header is complete and ODESY now displays the format header format. Enter the following data:

```
 INSERT FORMAT INV           P.1
|
|     FORMAT HEADER
|FORMAT.NAME                  [T1  ]
|NEXT.FORMAT                  [T1  ]
|SECURITY.LEVEL                 [4Ø]
|CURSOR.ADVANCE                 [  ]
|LINE.ADVANCE                   [2 ]
|NO.VERIFY: ,N                    [ ]
|FORMAT.TYPE: ,B,K,S,C,U          [ ]
|USER.PROGRAM.NAME      [          ]
|        [          ] / [          ] [ ]
```

Again there are no errors and the first field format appears. ODESY offers a field sequence number of 10 as the default. Note that the control line contains the group name, format name, and field sequence number, and that the field sequence number is automatically placed in the field provided. It may be overridden if desired. Enter the following data:

```
 INSERT FIELD  INV T1   010 P.1

     FIELD DETAILS 1

SEQUENCE.NUMBER                [010]
FLD.NAME [CUSTOMER                    ]
FIELD.LENGTH                  [8  ]
SPACES.BEFORE/AFTER.DESC       [4 ] [12]
LINES.AFTER.DESCRIPTION        [1 ]
HIGHLIGHT: ,B,U,R,S            [R]
DUPLICATE.IN: ,D               [ ]
VERIFY.METHOD: ,D,N            [D]    [ ]
```

The first field format contains the display options. This is followed by the second field format which contains the audit check options. Enter the following data:

```
 INSERT FIELD  INV T1   010 P.2

     FIELD DETAILS 2

FIELD.TYPE: ,N,S,O                          [N]
CONSTANT/RANGE.CK/VALUE.CK: ,C,R,V          [ ]
MANDATORY: ,M                               [M]
DATE.CHECK: ,D                              [ ]
CDV: ,1-9; XFOOT: ,+,-              [3]     [ ]
BATCH.TOTAL: ,1-5                           [ ]
JUSTIFY.IN: ,L,R                            [ ]
                                            [ ]
```

The third field format follows the second. It contains output options and display options. Enter the following data:

```
 ----------------------------------------
| INSERT FIELD  INV T1   Ø1Ø P.3         |
|                                        |
|     FIELD DETAILS 3                    |
|                                        |
|OUTPUT.POSITION               [4  ]     |
|WRITE.AFTER: ,W,S,C             [ ]     |
|DUPLICATE.OUT: ,D,C             [D]     |
|JUSTIFY.OUT: ,L,R; PACKED: ,P,H [R] [P] |
|BLANK.FILL: ,B; SIGN: ,+,-      [ ] [ ] |
|NAME.COLUMN                   [   ]     |
|DATA.COLUMN                   [   ]     |
|PRINT.AFTER: ,P,S,C             [ ] [ ] |
 ----------------------------------------
```

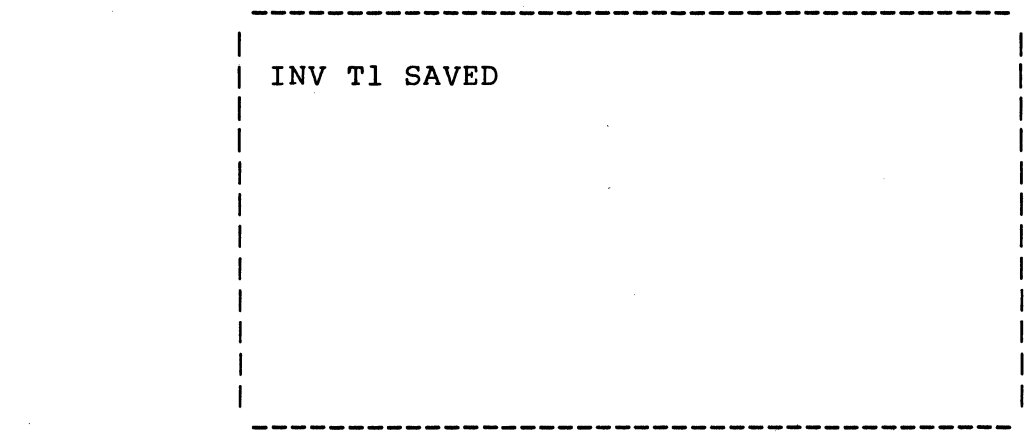
If an inserted constant, range check constant, or value check constant is selected, the third field format is followed by a constant format. For instance, for field 6Ø enter the following data:

```
 ----------------------------------------
| INSERT V-CONS INV T1   Ø6Ø P.4         |
|                                        |
|[      ]                                |
|[NUTS  ]                                |
|[BOLTS ]                                |
|[SCREWS]                                |
|[      ]                                |
|                                        |
|                                        |
|                                   [ ]  |
|                                        |
|                                        |
 ----------------------------------------
```

When the complete format has been entered, save the contents of the workarea in the Formats file.

Enter: /SAVE

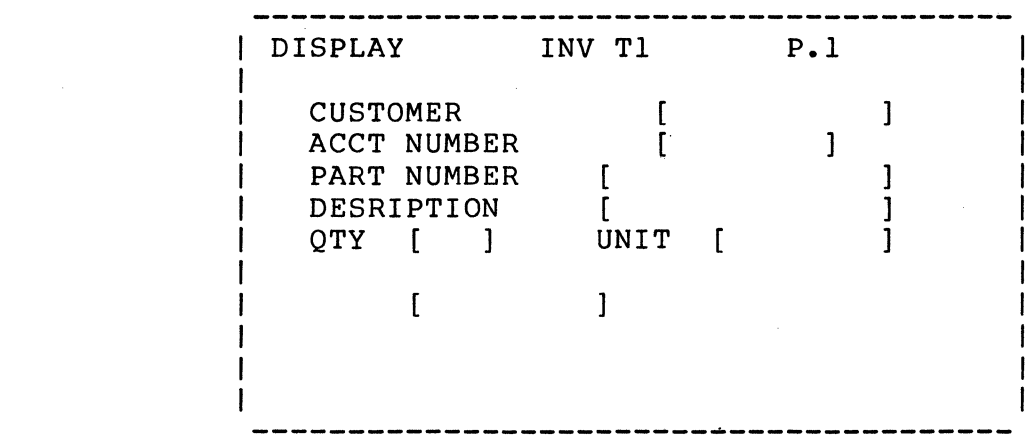
ODESY replies:



You may now view the format as it would appear for data entry.

Enter: /DISPLAY

ODESY replies:



The contents of the workarea are not changed by the SAVE command. If further maintenance is required for this format, you may do it without reloading it to the workarea. However, if you want to work on other formats, you must use the GET command.

At this point you may list or amend format data in the workarea. For instance, you may inspect the format header.

Enter: /LIST FORMAT

ODESY replies:

```
 ----------------------------------------
| LIST   FORMAT INV T1        P.1        |
|                                        |
|     FORMAT HEADER                      |
|FORMAT.NAME                  [T1  ]     |
|NEXT.FORMAT                  [T1  ]     |
|SECURITY.LEVEL                 [40]     |
|CURSOR.ADVANCE                 [00]     |
|LINE.ADVANCE                   [02]     |
|NO.VERIFY: ,N                   [ ]     |
|FORMAT.TYPE: ,B,K,S,C,U         [ ]     |
|USER.PROGRAM.NAME      [          ]     |
|        [          ] / [          ] [ ] |
 ----------------------------------------
```

Or you may make changes to field 70.

Enter: /AMEND 70

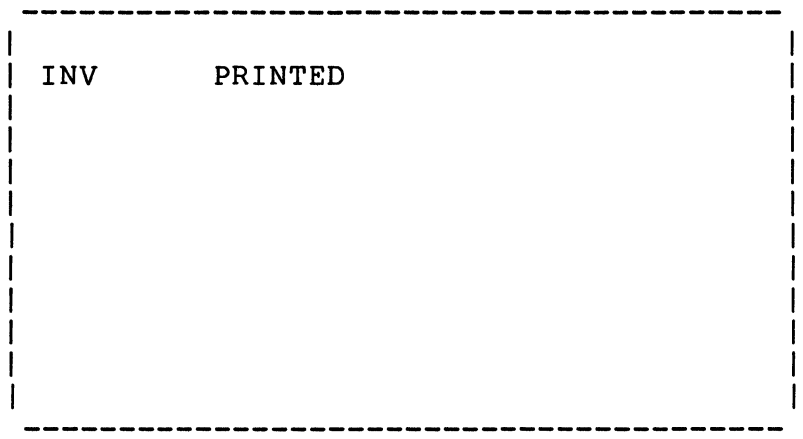
ODESY replies:

```
 ----------------------------------------
| AMEND  FIELD  INV T1   070 P.1         |
|                                        |
|     FIELD DETAILS 1                    |
|                                        |
|SEQUENCE.NUMBER               [070]     |
|FLD.NAME [                          ]   |
|FIELD.LENGTH                 [008]      |
|SPACES.BEFORE/AFTER.DESC      [09] [00] |
|LINES.AFTER.DESCRIPTION       [01]      |
|HIGHLIGHT: ,B,U,R,S           [ ]       |
|DUPLICATE.IN: ,D              [ ]       |
|VERIFY.METHOD: ,D,N           [ ]   [ ] |
 ----------------------------------------
```

To obtain a printed report, use the PRINT command. Suppose you wish to print all of the formats in group INV.

Enter: /PRINT INV

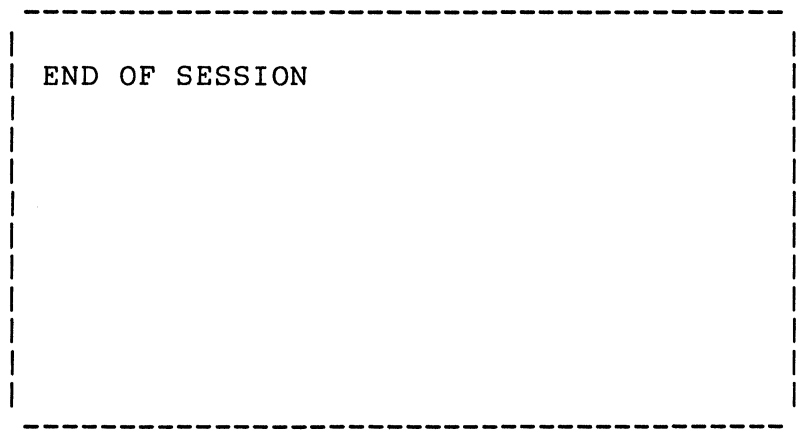
ODESY replies briefly with the statement PRINT STARTED and then overlays the line with:



Finally, log out.

Enter: /BYE

ODESY replies:



SECTION 7. EDIT AND EXTRACTION PROGRAMS

ODESY is designed primarily for the entry of batches of data which are later processed by an application system. Auditing facilities enable the terminal operator to check data for errors during the entry and verification stages so that the application system may process error-free data. This procedure is completed by the terminal operator through the use of two programs: the Edit Program and the Extraction Program. Refer to the B 1000 Series On-Line Data Entry System (ODESY) Terminal Operator's Manual, form 1131851, for complete instructions in the entry, verification, and extraction of data, and the execution of these two programs.

EDIT PROGRAM

The Edit Program (EDIT) is an on-line interactive program capable of coordinating the entry of data from a large number of ODESY stations. This program is used to create batches of error-free data in the Tank file by allowing each terminal operator at an ODESY station to enter a batch of data, one record at a time, under the control of screen formats and a set of commands. The data is checked for errors and stored in the Tank file when it is correct. If there are errors in the data, the operator is informed by the program and must correct the errors.

Once data has been entered it may be recalled by the operator. There is an optional verification stage in which the operator re-enters the data. It is compared with the original entry and differences are reported to the operator. ODESY also allows the operator to make minor changes to the data, or insert or delete records. The operator indicates that a batch is complete by scheduling it for extraction. The batch in the Tank file may then be processed by the next ODESY program.

The Edit Program obtains information such as details of operators, stations, and check digit verification schemes from the System file. Each operator must log in, using a number and password, and this is checked against the file. Similarly, each station is checked against the file. Both the station and the operator must be valid.

The formats are obtained from the Formats file. They indicate what is to appear on the screen and which audit checks are to be applied.

EXTRACTION PROGRAM

The Extraction Program (EXTRACT) is used to take batches of error-free data from the Tank file and create serial files on disk or tape suitable for processing by an application system. Only batches which have been scheduled for extraction by the Edit Program are taken. Extraction can be performed at the same time data is being entered or it may be used as a stand-alone process. Each batch in the Tank file either creates a new application file or is added to the end of an existing application file of the same name. The name of the file and its physical characteristics are obtained from the Formats file.

The batch is processed, one record at a time, under the control of the formats used to enter the data. The formats, also obtained from the Formats file, describe the layout of the data in the application file and in the printed journal. Certain control information and parameters, such as date type and page size, are obtained from the System file.

For each batch processed, the Extraction Program produces an application file and a printed report called the Extraction Journal. The journal contains selected data from the batch and can be used as an audit trail. An Extraction Report, which contains a summary of the batches processed in each execution of the program, is also printed. Figure 3 shows a sample Extraction Journal and a sample Extract Report.

EXTRACT is also responsible for deleting batches from the Tank file and for collecting statistical data about the batches processed.

```
B1000 ON-LINE DATA ENTRY SYSTEM          E X T R A C T  R E P O R T          TIME 11:54  DATE 01/28/81  PAGE   1

              LAST REPORT:   15   DATED: 01/20/81                                          REPORT:  16

BATCH SCHD GROUP OUTPUT   (PACK)        FILE NAME          RECORDS IN BATCH      OUTPUT RECORDS   LINES
       BY  NAME  MEDIUM                                ENTERED VERIFIED RE-EXTD BEFORE   AFTER  PRINTED

 999    1  SYS                      ODESYSETUP/INPUT        92        0      92        5     162      191 BATCH EXTRACTED
```

```
B1000 ON-LINE DATA ENTRY SYSTEM          E X T R A C T I O N  J O U R N A L          TIME 11:53  DATE 01/28/81  PAGE   1

   BATCH 999              DISK FILE              ODESYSETUP/INPUT

CONI      MAX FORMATS/FIELDS          0100    MAX CHARS OF CONST DATA     0200    MAX USER PROGRAMS            00
          MAX IN SZ/ZTNK FULL   0160   95    REC SZ OF TANK FILE:A,B,C      A    PAGE SZ/DATE TYP:U,I,E     60 U
0630      MAX FIELDS - FORMAINT       063    MAX CHARS OF CONST DATA     0500    MAX CHARS SCRATCHPAD CNS   0100
          MAX FORMATS - EXTRACT        10    MAX FIELDS                  0200    MAX CHARS OF CONST DATA    1000
          MAX OUTPUT RECORD SIZE      400
NNNN      DUPLICATE ANY: Y,N             N    RESTRICT OPTIONS: R,N                ACCEPT        N CONTROL      N
          DELETE      N INSERT           N    SCHEDULE      N SCHD.DEL       N     EXT.SCHD      N TERMINATE    N
          INCLUDE OPTIONS/COMMANDS:I,E
          OPTS-CDV    I BTOT             I    XFOOT         I
          CMDS-ACCEPT I CONTROL          I    DELETE        I DISPLAY        I     INSERT        I READY        I
          EXT.SCH     I SS               I    STATUS        I WRU            I     OS            I
I01 I     LOGICAL STATION NUMBER        01    STATION NAME          ID802          STATION BUFFER SIZE      1920
          FORMS SET:A,B,C                A    TERMINAL TYPE               42       CONTROL STATUS: ,C          C
I01 I     OPERATOR NUMBER               01    OPERATOR NAM    SUPERVISOR 1       OPERATOR SECURITY LEVEL    99
          OPERATOR TYPE:O,S              S
I02 I     OPERATOR NUMBER               02    OPERATOR NAM    SUPERVISOR 2       OPERATOR SECURITY LEVEL    99
          OPERATOR TYPE:O,S              S
I03 I     OPERATOR NUMBER               03    OPERATOR NAM    SUPERVISOR 3       OPERATOR SECURITY LEVEL    75
          OPERATOR TYPE:O,S              S
I04 I     OPERATOR NUMBER               04    OPERATOR NAM    SUPERVISOR 4       OPERATOR SECURITY LEVEL    50
          OPERATOR TYPE:O,S              S
I05 I     OPERATOR NUMBER               05    OPERATOR NAM    SUPERVISOR 5       OPERATOR SECURITY LEVEL    25
          OPERATOR TYPE:O,S              S
I06 I     OPERATOR NUMBER               06    OPERATOR NAM    OPERATOR 10        OPERATOR SECURITY LEVEL    90
          OPERATOR TYPE:O,S              0
I11 I     OPERATOR NUMBER               11    OPERATOR NAM    OPERATOR 11        OPERATOR SECURITY LEVEL    80
          OPERATOR TYPE:O,S              0
I12 I     OPERATOR NUMBER               12    OPERATOR NAM    OPERATOR 12        OPERATOR SECURITY LEVEL    60
          OPERATOR TYPE:O,S              0
I13 I     OPERATOR NUMBER               13    OPERATOR NAM    OPERATOR 13        OPERATOR SECURITY LEVEL    40
          OPERATOR TYPE:O,S              0
I14 I     OPERATOR NUMBER               14    OPERATOR NAM    OPERATOR 14        OPERATOR SECURITY LEVEL    20
          OPERATOR TYPE:O,S              0
I15 I     OPERATOR NUMBER               15    OPERATOR NAM    OPERATOR 15        OPERATOR SECURITY LEVEL    10
          OPERATOR TYPE:O,S              0
001S      001 SECURITY LEVEL ERROR
001S      002 CLOSING DOWN-END YOUR WORK NOW
003C      003 CLOSE FORCED-YOU ARE LOGGED OUT
003C      004 SYSTEM ERROR-LAST COMMAND LOST
005T      005 THE BATCH IS NOW CLOSED
005T      006 THE RECORD IS ACCEPTED
007N      007 NOW SCHEDULED FOR EXTRACTION
007N      008 RECOVERY STARTED
009A      009 A BATCH IS ALREADY OPEN
009A      010 YOU ARE NOT ENTERING DATA
011A      011 AN OPERATOR IS LOGGED IN
011A      012 NO OPERATOR IS LOGGED IN
013Y      013 YOU ARE LOGGED IN ELSEWHERE
013Y      014 YOUR NAME ISN'T ON FILE
```

Figure 3. Extraction Report and Extract Journal

SECTION 8. AUXILIARY PROGRAMS

There are four auxiliary ODESY programs. The Batch Status Print Program may be used in data control. The Statistics Analysis Program is a management aid to effective system use. The Dumpfile Conversion Program is a conversion aid. The Tank File Analysis Program is a debugging aid which may be used by your Burroughs System Support Representative.

BATCH STATUS PRINT PROGRAM

The Batch Status Print Program (PRINT) produces a report showing all existing batches and their current status. It may be used for purposes of data control in determining how many batches have been entered and by whom.

For each batch, the report shows the operator who first opened the batch, the date it was first opened, the date it was last accessed, the operator who scheduled the batch for extraction (if any), the number of records in the batch, the group associated with the batch, and the values of four status flags. These flags are enter status, verify status, extract status, and delete status. The information produced by this report is similar to that produced by the Edit Program STATUS command.

To ensure that the correct batches are scheduled for extraction or deletion, execute this program before executing the Extraction Program.

Figure 4 shows a sample Batch Status Print Report.

B1000 ON-LINE DATA ENTRY SYSTEM B A T C H S T A T U S P R I N T R E P O R T TIME 11:38 DATE 01/28/81 PAGE 1

BATCH	NUMBER OF RECORDS	GROUP	OPEN OPR	SCH OPR	STATUS FLAGS ENTER	VERIFY	EXTRACT	DELETE	•DATE CREATED	DATE LAST ACCESSED	IN USE AT
3	4	T4	1	1	COMPLETED		DONE		01/17/81	01/17/81	
4	3	T1	1	1	COMPLETED		DONE		01/19/81	01/19/81	
5	5	HOPE	1	1	COMPLETED		DONE		01/19/81	01/20/81	
999	92	SYS	1	1	COMPLETED		DONE		11/24/80	11/24/80	

Figure 4. Batch Status Print Report

STATISTICS ANALYSIS PROGRAM

The Statistics Analysis Program (STATS) produces two statistics reports: the Formats Report and the Operator Report. Using the data gathered by the Edit and Extraction Programs, each report summarizes the data entered and released since the last execution of the Statistics Analysis Program. These reports may be used by management to identify sources of inefficiency in the system.

An identifying transaction number is printed at the top of each report. Each time the program is executed, this number is increased by one. The report also shows the transaction number of the last report and the date on which it was produced.

The Formats Report shows the utilization of each format and the volume of data for each application. It includes the number of records entered for each format and group of formats.

The Operator Report shows the number of records entered and verified, the approximate number of keystrokes for Enter mode and Verify mode, the elapsed time (the time spent logged in at a terminal), the number of records per hour, and the approximate number of keystrokes per hour. The report includes a detail line for each operator and a total for all operators.

The details of elapsed time in the Operator Report are gathered by the Edit Program, but all of the other information is gathered by the Extraction Program and refers only to batches which have been extracted or deleted. If there is a long delay between entering and extracting batches, executing this program once a day will produce distorted figures for the numbers of records and keystrokes per hour. Executing this program once a week or once a month should produce a more accurate report.

Figure 5 shows a sample Formats Report and figure 6 shows a sample Operator Report.

```
81000 ON-LINE DATA ENTRY SYSTEM   S T A T I S T I C S   A N A L Y S I S   R E P O R T   TIME 11:04   DATE 01/23/81   PAGE   1
                                                                                                    REPORT#  1

                                F O R M A T S   R E P O R T

   GROUP SYS          FORMAT    RECORDS ENTERED
                      CUNF      0
                      CUN2      0
                      CUN3      0
                      CUN4      0
                      STA       0
                      OPR       0
                      TEXT      0
                      CMD2      0
                      CMD3      0
                      CMD4      0
                      CDV       0
                      PRNT      0
                      SQUA      0
                      CUN3      0

   TOTAL FOR GROUP              0
```

Figure 5. Formats Report

B1000 ON-LINE DATA ENTRY SYSTEM S T A T I S T I C S A N A L Y S I S R E P O R T TIME 11:04 DATE 01/23/81 PAGE 1

REPORT# 1

O P E R A T O R R E P O R T

OPERATOR	NUMBER OF RECORDS ENTERED / VERIFIED		NUMBER OF CHARACTERS ENTER MODE / VERIFY MODE		TOTAL ELAPSED TIME (HH:MM)	RECORDS PER HOUR (ENTER + VERIFY)	CHARACTERS PER HOUR (ENTER + VERIFY)
1 SUPERVISOR 1	156	0	4443	0	8:49	17	503
2 SUPERVISOR 2	0	0	0	0	0:00		
3 SUPERVISOR 3	0	0	0	0	0:00		
4 SUPERVISOR 4	0	0	0	0	0:00		
5 SUPERVISOR 5	0	0	0	0	0:00		
10 OPERATOR 10	0	0	0	0	0:00		
11 OPERATOR 11	0	0	0	0	0:00		
12 OPERATOR 12	0	0	0	0	0:00		
13 OPERATOR 13	0	0	0	0	0:00		
14 OPERATOR 14	0	0	0	0	0:00		
15 OPERATOR 15	0	0	0	0	0:00		
TOTALS	156	0	4443	0	8:49	17	503

Figure 6. Operator Report

DUMPFILE CONVERSION PROGRAM

The structure of the Formats file may change betweem major releases of ODESY, as additional facilities become available, so a version of the Dumpfile Conversion Program (CONVERT) is provided with each release to enable users to convert their existing formats. CONVERT may be executed while any ODESY program is in operation. An alternative use of this program is to produce a Dump File Conversion Report, listing all groups and formats in the file.

This program does not directly convert the Formats File; it modifies the existing Format Dump file. First, create a Dump file using the old version of the Format Maintenance Program and then execute the Dumpfile Conversion Program. When this is complete, load the modified Dump file to the Formats file using the new version of FORMAINT. The Format Dump file is marked with its current system-identification and release level, so the file will not be changed if the program is executed twice.

Execute the Dumpfile Conversion Program from the ODT. Enter and transmit:

```
EX ODESY/CONVERT
```

Only messages displayed on the ODT screen are prompts for ODT input. The program requires the name of the Dump file(s) to be converted via an accept message at the ODT. Respond with the mix number of the Dumpfile Conversion Program. Enter and transmit:

```
<mix number> AX <Format Dump file name>
```

The program modifies the file to be compatible with the new version of FORMAINT and produces a Dump File Conversion Report showing all groups and formats which have been modified. CONVERT then requests another Dump file name.

To terminate the program, enter and transmit:

```
<mix number> AX
```

In the event of hardware or software failure, dump the Format Dump file from the old version again and re-execute the program. Once conversion is complete, the program may be removed from disk.

Figure 7 shows a sample Dump File Conversion Report.

```
81000 ON-LINE DATA ENTRY SYSTEM  D U M P F I L E   C O N V E R S I O N   R E P O R T  TIME 13:30  DATE 01/28/81  PAGE  1

  DUMPFILE:  ODY12/DUMPFILE

                    GROUP FORMAT      DATE
                    MINT    HAND      11/17/80
                                      11/17/80
```

Figure 7. Dump File Conversion Report

TANK FILE ANALYSIS PROGRAM

The Tank File Analysis Program (DUMP) is used only when a fatal error occurs during data entry. You are alerted to this condition by the Edit Program message 74 PLEASE EXECUTE ODESY/DUMP. The program produces a diagnostic report which helps in identifying the source of trouble. Send this report and the error report produced by EDIT at the time of the error to your local Burroughs System Support Representative.

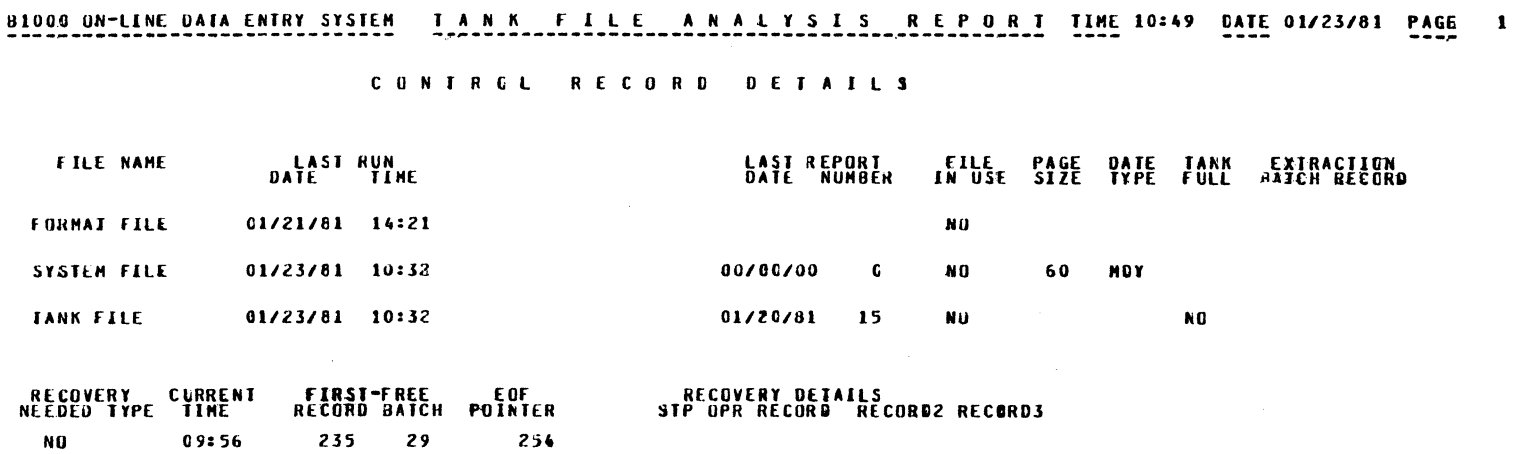
Execute the Tank File Analysis Program from the ODT. Enter and transmit:

```
EX ODESY/DUMP
```

The program produces a Tank File Analysis Report: a status report of the Formats, System, and Tank files, and a report of the Tank file. This detailed report includes the status of each batch in the Tank along with its status flags, addresses, group names, format names, and pointers.

Distinguish DUMP, the Tank File Analysis Program, from a Format Dump file which is a serial file containing format data. A Format Dump file may not be used as a Formats file. It is accessed through the Format Maintenance Program by the DUMP and LOAD commands.

Figure 8 shows a sample Tank File Analysis Report.



B1000 ON-LINE DATA ENTRY SYSTEM T A N K F I L E A N A L Y S I S R E P O R T TIME 10:49 DATE 01/23/81 PAGE 1

C O N T R O L R E C O R D D E T A I L S

FILE NAME	LAST RUN DATE	LAST RUN TIME	LAST REPORT DATE	LAST REPORT NUMBER	FILE IN USE	PAGE SIZE	DATE TYPE	TANK FULL	EXTRACTION BATCH RECORD
FORMAT FILE	01/21/81	14:21			NO				
SYSTEM FILE	01/23/81	10:32	00/00/00	0	NO	60	MDY		
TANK FILE	01/23/81	10:32	01/20/81	15	NO			NO	

RECOVERY NEEDED	CURRENT TYPE	CURRENT TIME	FIRST-FREE RECORD	FIRST-FREE BATCH	EOF POINTER	RECOVERY DETAILS STP	OPR	RECORD	RECORD2	RECORD3
NO		09:56	235	29	254					

Figure 8. Tank File Analysis Report

SECTION 9. INQUIRY FACILITIES

Several inquiry facilities are available with ODESY. These inquiry facilities require the presence of a program or programs written by the user. A user program is an on-line program that communicates with the Edit Program and is responsible for accessing a master file or data base. It is written by the user to fit a particular requirement, such as inquiry checks, master file checks, or real time updating. At the time of execution, the user program communicates with the Edit Program to supply or check data.

ODESY allows these inquiry facilities:

a. Data base inquiry.
b. Data base updating.
c. Existence checking.
d. Interactive data entry.
e. Inter-field checks.

It is the responsibility of the user program to access the data base and to perform any checks not specified in the formats. A user program may be written in COBOL, RPG, or UPL. The worked examples included at the end of this section show sample programs in each of the three languages.

The flexibility of the inquiry facilities allows you to write a very sophisticated user program. You may prefer to begin writing a user program to perform existence checks or simple inquiries. Inquiry Example 1 shows a simple user program which performs existence checks.

If you do not require inquiry facilities, ignore all references to them. This will not effect the operation of the remainder of ODESY. Set the system parameter Maximum Number of User Programs to zero.

During data entry, you select a format, enter data, and select another format. The Edit Program supplies default data before entry and performs checks after entry. The default data and the checks to be performed are specified in the format.

Similarly, a user program may supply data before entry and perform checks after entry. A user program will be involved whenever an inquiry format is selected (format type = K, S, C, or U).

For a key data format, format type = K, the data you have entered is sent to the user program after the standard checks have been performed by EDIT. For a supply data format, format

type = S, the user program is asked to supply data before entry. For a check data format, format type = C, the data entered is checked by EDIT and sent to the user program for further checking. A supply-and-check format, format type = U, combines the functions of the supply data and check data formats.

This chart shows the sequence of events by format type. Arrows indicate the direction of communication between programs.

	Blank or B	K	S	C	U
Select format	X	X	X	X	X
EDIT ➡ user program			X		X
User program ➡ EDIT			X		X
EDIT displays format	X	X	X	X	X
Operator enters data	X	X	X	X	X
EDIT checks data	X	X	X	X	X
EDIT ➡ user program		X		X	X
User program ➡ EDIT				X	X
EDIT stores data	X	(X)	(X)	(X)	(X)
Select next format	X	X	X	X	X

If EDIT finds errors while checking the data, the format will be redisplayed with the errors indicated. Enter the correct data.

A format may be selected in one of three ways. You may select it initially by entering the format name, it may be selected automatically when a format is specified with a NEXT.FORMAT, or you may override the NEXT: field on the screen, in which case you are manually selecting another format.

If Inquiry mode is being used, no batch is open, so EDIT stores no data.

USER PROGRAM INTERFACE

DESIGN CONSIDERATIONS

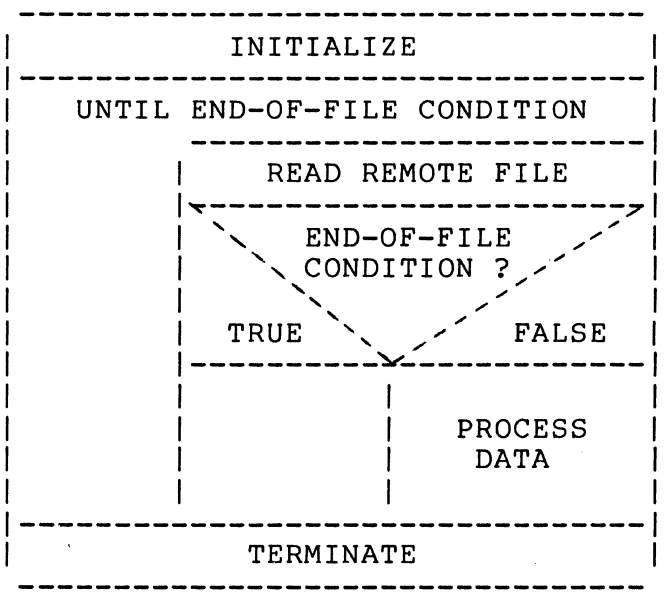
When writing a user program there are several design considerations with respect to the communications protocol.

A user program may be written in COBOL, RPG, or UPL. If COBOL is chosen, DMSII constructs may be used to access a DMSII data base. Similarly, other data bases may be accessed by the user program.

It is not necessary to execute a user program from the ODT. The user program will be zip-executed by EDIT whenever a format which specifies it is selected. Conversely, there are three methods by which a user program may be terminated. You may manually discontinue it by entering a DS command from a control station, EDIT may terminate it when you enter a CLOSE command at the station which is using it, or by terminating EDIT itself.

A user program communicates with EDIT through the remote file Stations. A remote file is a method of queuing messages. EDIT is a MCS-type program, and it uses the remote file to communicate with both terminals and user programs. Messages from a user program do not go directly to the terminals; they always go to EDIT. (EDIT sets the participating option when approving a file open.) If the user program specifies a remote key, it will be ignored.

The structure of a user program normally is:



The main part of the program is a READ statement, followed by a

set of procedure calls to process the message received and a return to the READ statement (see Inquiry Examples 1 and 2). The READ statement should have an AT END or ON.EOF branch because EDIT causes an end-of-file condition to terminate a user program.

The format of the messages in the remote file is described below.

MESSAGE FORMAT

There is a standard format for all messages received and sent (READ and WRITE) by the user program. The message consists of a 30-byte header, which may be followed by data. In COBOL nomenclature the message is:

```
01 ODESY-RECORD-AREA.
03 ODESY-MSG-TYPE              PIC 99.
03 ODESY-STATION               PIC 999.
03 ODESY-OPERATOR              PIC 99.
03 ODESY-BATCH                 PIC 999.
03 ODESY-RECORD                PIC 9999.
03 ODESY-GROUP                 PIC XXXX.
03 ODESY-FORMAT                PIC XXXX.
03 ODESY-LENGTH                PIC 9999.
03 ODESY-ERRORS                PIC 99.
03 ODESY-MODE                  PIC X.
03 ODESY-ACTION                PIC X.
03 ODESY-DATA                  PIC X(INPUT-DATA-SIZE).
```

The user program normally receives a message and sends a message in reply. Those parameters which are not to be changed in the reply are noted below.

Message Type

Messages with these message types are received by the user program from EDIT:

```
01 key data message
02 supply data message
03 check data message
```

Messages with these message types are expected to be sent by the user program to EDIT:

```
11 data message
12 invalid key message
13 invalid format message
```

Station

This value is the logical station number (LSN) of the station that initiated the message. It must not be changed by the user program.

Operator

This number is that of the operator logged in at the station. It must not be changed by the user program.

Batch

This is the number of the batch that is open at the station. If Inquiry mode is being used, there is no batch open and this parameter is zero. It must not be changed by the user program.

Record

If a batch is open, this value is the relative record number of the record being entered, inserted, modified, or verified. It must not be changed by the user program.

Group

The group name is used in the OPEN command. It must not be changed by the user program.

Format

This option indicates the current format in use at the station. It may be changed only in reply to a supply data message. Inquiry Example 2 shows this.

Length

This value describes the length of ODESY-DATA. For an incoming supply data message it is zero. For an incoming key data or check data message it indicates the length of the data which follows the 30-byte header. In sending a data message, the user program is expected to set this parameter correctly.

Errors

In incoming messages this value is always zero. In replying to a check data message, the user program is expected to set this parameter if errors are found.

Mode

Mode indicates the current mode of the Edit Program. ODESY-MODE may assume these values:

1 = Enter mode
2 = Verify mode
3 = Display mode
4 = Inquiry mode

Action

This indicates the current action in which EDIT is involved. ODESY-ACTION may assume these values:

1 = Enter mode
2 = Verify mode
3 = Display mode
4 = Inquiry mode
5 = Modify
6 = Batch status
7 = Batch totals

Data

In incoming key data and check data messages, this option contains all of the data for the record in the order in which it was entered, that is in the order in which it was specified in the format. It will not be in the form expected by the output file or application file. This is also true for outgoing data messages. If the user program is replying to a check data message, and errors were detected, the fields in error should be marked (see Inquiry Examples 1 and 2).

The length of ODESY-DATA will never be greater than the value of the system parameter Input Data Size. However, for any particular message, the actual length of ODESY-DATA is given by ODESY-LENGTH.

INCOMING MESSAGES

The action taken by a user program after receiving a message usually depends on the group name, format name, and message type. The only rules enforced by ODESY refer to the message types of the messages sent in reply.

OUTGOING MESSAGES

The normal reply to a supply data message or a check data message is a data message (message type = 11). The data message either supplies data to EDIT or returns the result of checking the data. In both cases, EDIT normally presents the operator with a format and data.

However, if the user program sends an invalid key message (message type = 12) or an invalid format message (message type = 13), EDIT sends an error message to the operator. In the first case, it sends message 66 INVALID INQUIRY KEY and in the second case it sends message 67 INVALID INQUIRY FORMAT. If the user program sends an unrecognized message to EDIT, EDIT replies with message 68 INVALID INQUIRY REPLY.

INQUIRY FORMATS

There are four inquiry format types: key data, supply data, check data, and supply-and-check data. When FORMAINT is being used to enter an inquiry format, a user program name is required. This is the name of the user program that will receive all messages for this format. A user program must be able to handle messages for all inquiry formats for which it is named. An inquiry format cannot be used if the relevant user program is not on disk.

KEY DATA

When a key data format is used, a key data message (message type = Ø1) is sent to the user program after successful checking of the data. The user program must not reply to this message.

The key data format may be used for passing a key to the user program or for passing data to the user program for which no response is required. A key data format would normally have a supply data format as its NEXT.FORMAT, so that the information supplied for the latter relates to the key entered for the former. If this method is to be used for inquiry, the user program should have a table with one entry for each station. The key data supplied would be stored in this table for use with later supply data or check data messages. Format AP VEND in Inquiry Example 2 is an example of a key data format.

SUPPLY DATA

When a supply data format is used, a supply data message (message type = Ø2) is sent to the user program before you are allowed to enter any data. The user program is expected to reply with a data message (message type = 11), an invalid key message (message type = 12), or an invalid format message (message type = 13). If it is a data message, EDIT inspects the format name in the message, and if this format is a supply data format or a supply-and-check format, the data at the end of the message is presented. The ability to change the format name allows the user program to alter the sequence of formats when there is no more data for this format or for this key. (See Inquiry Example 2, where the format is changed from AP INVC to AP VEND when there are no more invoices to supply.)

A supply data format may be used for pure inquiry (no batch), or for interactive data entry where the data supplied will help the operator in entering a batch. Format AP INVC in Inquiry Example 2 is an example of a supply data format.

CHECK DATA

When a check data format is used, a check data message (message type = Ø3) is sent to the user program after successful checking by EDIT of the data. The user program is expected to reply with a data message (message type = 11) or an invalid key message (message type = 12) or an invalid format message (message type = 13). If it is a data message, EDIT examines the ODESY-ERRORS parameter in the message. If this parameter is greater than zero, the data in the message is presented for correction. If the ODESY-ERRORS parameter is zero and there is a batch open (i.e., not Inquiry mode), the data in the message is stored in the batch. In this way the user program modifies the data before returning it to EDIT and this modified data is stored in the batch.

A check data format may be used for on-line updating (no batch), for inter-field checks where the allowable values for one field depend on the value entered for another field, or for existence checking. Format INVC REC1 in Inquiry Example 1 is an example of a check data format used for existence checking.

SUPPLY-AND-CHECK

When a supply-and-check format is used, a supply data message (message type = Ø2) is sent to the user program before the operator is allowed to enter any data and a check data message (message type = Ø3) is sent to the user program after successful checking by EDIT of the data.

A supply-and-check format combines the functions of a supply-data format and a check-data format. Format AP NAME in Inquiry Example 2 is an example of a supply-and-check format.

INQUIRY MODE

When inquiry formats are being used, batches are often unnecessary. Examples of this are pure inquiry, where there is no data entry, and on-line updating, where the user program uses the data entered directly to update a data base. In such cases, Inquiry mode may be used.

To get into Inquiry mode, enter the OPEN command followed by the keyword INQUIRY:

```
/OPEN INQUIRY <group>
```

You may now use the INQUIRY command to call up any format in the specified group:

```
//<format>
```

With the aid of the NEXT.FORMAT feature, you may be guided through an inquiry or update sequence. The AP formats in Inquiry Example 2 may be referenced in Inquiry mode.

To get out of Inquiry mode, enter a CLOSE command:

```
/CLOSE
```

Note that the Edit Program commands ACCEPT, DELETE, DISPLAY, ENTER, INSERT, MODIFY, and VERIFY may not be used in Inquiry mode.

EDIT COMMANDS WITH INQUIRY FORMATS

ACCEPT

This command is not affected by the format type. The record being entered or inserted is added to the batch, even though it may contain errors. However, no message is sent to the user program to indicate that the record has been accepted.

DELETE

This command is not affected by the format type. The record is deleted from the batch. However, no message is sent to the user program to indicate that the record has been deleted.

DISPLAY

This command is not affected by the format type. The data to be displayed is taken from the batch, even if it is a supply data format or a supply-and-check format. No message is sent to the user program.

ENTER

For a supply data format or a supply-and-check format, the user program is asked to supply data before entry. For a key data format, a check data format, or a supply-and-check format, the data is passed to the user program after entry.

INSERT

For a supply data format or a supply-and-check format, the user program is asked to supply data before entry. For a key data format, a check data format, or a supply-and-check format, the data is passed to the user program after entry.

MODIFY

For a supply data format or a supply-and-check format, the data presented for modification is taken from the batch. For a key data format, a check data format, or a supply-and-check format, the data is sent to the user program after entry. Thus key data and check data messages are sent, but supply data messages are not sent.

VERIFY

For a supply data format or a supply-and-check format, the data presented for verification is taken from the batch if the display or no verify option is set or from the user program if the standard rekey verify option is set. If the format is a key data format, a check data format, or a supply-and-check format, the data is sent to the user program after entry. In this way key data and check data messages are sent and supply data messages are sent if standard verify is specified for the format.

INQUIRY EXAMPLE 1

Inquiry Example 1 demonstrates how a simple existence check may be performed.

Format INVC REC1 is used for the entry of invoices. The stock number in each invoice is to be checked by the user program STOCKINQ against a file of valid stock numbers. For simplicity, the stock number is used directly as a key to access the stock file. The interface to ODESY would remain the same if a data base were being accessed.

FORMAT INVC REC1

The format is a check data format and refers to the user program STOCKINQ. The stock number appears in bytes 6-10 of the input record.

DATA DIVISION (COBOL EXAMPLE)

The record area for the remote file is defined as 30 bytes of header information followed by 160 bytes of data. The 160 bytes of data is consistent with the Tank File Record Size option set to A. The record area is redefined so that it corresponds with the INVC REC1 format. The only important item in the redefinition is the stock number, which is to be checked.

PROCEDURE DIVISION (COBOL EXAMPLE)

During initialization, the stock file and the remote file are opened. The rest of the program is a loop to read the remote file and process the messages received.

If the format in the message is not INVC REC1, an invalid format message (message type = 13) is sent. Otherwise the stock number is checked against the stock file. If the number is valid, a data message (message type = 11) is sent, with the data unchanged and ODESY-ERRORS = Ø. If the stock number is invalid, a data message is still sent, but asterisks are used to indicate a stock number error in the data and ODESY-ERRORS = 1.

On end-of-file, for the remote file, the program terminates.

B1000 ON-LINE DATA ENTRY SYSTEM — F O R M A T M A I N T E N A N C E R E P O R T — TIME 15:22 DATE 01/27/81 PAGE 1

GROUP NAME INVC — FILE NAME IC110 — DATE LAST CHANGED 01/21/81

RECORD SIZE 80 BLOCKED 1 RECORDS/AREA 500 AREAS 40 ON DISK — REPORT DATE FORMAT AS SYS
GROUP SIGN CONVENTION MSD

FORMAT NAME INVCREC1 — NEXT FORMAT INVCREC1 — SECURITY 50 — VERIFY CHECK — DATE LAST CHANGED 01/21/81
LINE ADVANCE 2 — CURSOR ADVANCE 0
USER PROGRAM NAME STOCKINQ

```
000 0000 REC1      [ ][REC1]

    BATCH NO 2/3 [     ]
    STOCK NO     [          ]
    ST.CODE      [A]       TR NO [     ]
    QUANTITY     [         ]   D. F. [0]
    VALUE        [          ]
    DATE         [      ] REC.CODE    [2]
    AUX CODE     [ ]
```

DISPLAY SPECIFICATIONS

SEQ	NAME	LENGTH	SPACE BEFORE	SPACE AFTER	LINE ADVANCE	HIGHLIGHT	DUP IN	DISP VER
10	BATCH NO 2/3	5	5	1	1		D	D
20	STOCK NO	15	5	5	1			D
30	ST.CODE	1	5	6	0			D
40	TR NO	5	8	1	1			D
50	QUANTITY	9	5	5	0			D
60	D. F.	1	4	1	1			D
70	VALUE	11	5	8	1			D
80	DATE	6	5	9	0		D	D
90	REC.CODE	1	1	4	1			D
100	AUX CODE	1	5	5	0			D

B1000 ON-LINE DATA ENTRY SYSTEM — F O R M A T M A I N T E N A N C E R E P O R T — TIME 15:22 DATE 01/27/81 PAGE 2

OTHER SPECIFICATIONS

SEQ	TYPE	CNS/VAL /RANGE	NAND	DATE	CDV	CROSSFOOT	BATCH TOTALS	JUST IN	OUT POSN	WRITE AFTER	DUP OUT	JUST OUT	PACK OUT	BLANK FILL	SIGN	NAME COL	DATA COL	PRINT AFTER
10	UN		M						3			R		B			23	
20	UN		M					R	8			R		B			29	
30	AN	V	M						23							45	53	
			CONSTANTS		A S U													
40	UN		M						24			R		B			56	
50	UN						1	L	29			R		B			62	
60	AN	V	M						38								72	
			CONSTANTS		0 1													
70	UN						2		39			R		B		74	80	
80	UN		M						30								92	
90	UN	V							1							1	10	
			CONSTANTS		2 3													
100	UN	V							2	C						12	21	C
			CONSTANTS		0 1 2													

**** TOTALS ****

FIELDS INPUT	10	FIELDS OUTPUT	10
INPUT DATA SIZE	55	CHARACTERS OF CONSTANT DATA	11
OUTPUT DATA SIZE	55	CONSTANTS REQUIRED BY EXTRACT	0
FIELDS PRINTED	14	MINIMUM SCREEN SIZE OF FORMAT	12 BY 80

```
BURROUGHS B1800/B1700 COBOL COMPILER, MARK IX.0.0 (08/28/80 19:35)                    TUESDAY  , 01/27/81, 12:13:35
DDY20DEMOD/STOCKINQ.C

001000 $ CARD CHECK SINGLE CONTROL SUPPRESS
002000   IDENTIFICATION DIVISION.
003000 * -----------------------
004000   PROGRAM-ID. STOCKINQ
005000   AUTHOR. DATA ENTRY GROUP.
006000   DATE-WRITTEN. JULY 1980.
007000   DATE-COMPILED.
                        TIME 12:11 DATE 01/27/81.
008000 *
009000   ENVIRONMENT DIVISION.
010000 * --------------------
011000   CONFIGURATION SECTION.
012000   SOURCE-COMPUTER. B-1800.
013000   OBJECT-COMPUTER. B-1800.
014000   INPUT-OUTPUT SECTION.
015000   FILE-CONTROL.
016000       SELECT STOCK-FILE ASSIGN TO DISK,
017000              ACCESS MODE IS RANDOM,
018000              ACTUAL KEY IS STOCK-KEY.
019000       SELECT REMOTE-FILE ASSIGN TO REMOTE.
020000 /
021000   DATA DIVISION.
022000 * -------------
023000   FILE SECTION.
024000   FD   STOCK-FILE
025000        FILE CONTAINS 10 BY 500 RECORDS
026000        BLOCK CONTAINS 20 RECORDS
027000        RECORD CONTAINS 6 CHARACTERS
028000        VALUE OF ID IS "STOCKFILE".
029000   01   STOCK-REC.                                                    000,0000056
030000        03 STOCK-NO              PIC 9(5).                           000,0000056
031000        03 STOCK-VALID           PIC 9.
032000 *                                                                   000,0000066
033000   FD   REMOTE-FILE
034000        VALUE OF ID IS "STATIONS".
035000   01   ODESY-RECORD-AREA.                                           000,0000068
036000        03 ODESY-MSG-TYPE        PIC 99.                    (0001)  000,0000068
037000        03 ODESY-STATION         PIC 999.                           000,0000072
038000        03 ODESY-OPERATOR        PIC 99.                            000,0000078
039000        03 ODESY-BATCH           PIC 999.                           000,0000082
040000        03 ODESY-RECORD          PIC 9999.                          000,0000088
041000        03 ODESY-GROUP           PIC XXXX.                          000,0000096
042000        03 ODESY-FORMAT          PIC XXXX.                          000,0000104
043000        03 ODESY-LENGTH          PIC 9999.                          000,0000112
044000        03 ODESY-ERRORS          PIC 99.                            000,0000120
045000        03 FILLER                PIC XX.                            000,0000124
046000        03 ODESY-DATA            PIC X(160).                        000,0000128
047000   01   INVCREC1-AREA.                                               000,0000068
048000        03 FILLER                PIC X(30).                         000,0000068
049000        03 INVC-BATCH            PIC 9(5).                          000,0000128
050000        03 INVC-STOCK-NO         PIC 9(5).                  (0002)  000,0000138
051000        03 INVC-ST-NO-ERRORS
052000           REDEFINES INVC-STOCK-NO PIC X(5).                         000,0000138
053000        03 INVC-STOCK-CODE       PIC X.                             000,0000148
054000        03 INVC-TR-NO            PIC 9(5).                          000,0000150
055000        03 INVC-QUANTITY         PIC 9(9).                          000,0000160
056000        03 INVC-DF               PIC X.                             000,0000178
057000        03 INVC-VALUE            PIC 9(11).                         000,0000180
058000        03 INVC-DATA             PIC 9(6).                          000,0000202
059000        03 INVC-REC-CODE         PIC 9.                             000,0000214
060000        03 INVC-AUX-CODE         PIC 9.
061000 *                                                                   000,0000216
062000   WORKING-STORAGE SECTION.
063000   77   STOCK-KEY               PIC 9(8) COMP.                     000,0000448
064000   77   INPUT-STOCK-RECORD      PIC X(9).
```

```
065000 /                                                                        000,0000456
066000   PROCEDURE DIVISION.
067000 * ------------------                                                     000,0000000
068000   INITIALIZE.                                                           000,0000000
069000       OPEN I-O STOCK-FILE.                                              000,0000000
070000       OPEN I-O REMOTE-FILE.                                             000,0000082
071000   MAIN-LOOP.                                                            000,0000164
072000       READ REMOTE-FILE AT END STOP RUN.                                 000,0000164
073000       IF ODESY-GROUP = "INVC" AND ODESY-FORMAT = "REC1"                 000,0000491
074000          GO TO INVCREC1-CHECK.                                          000,0000573
075000 *     ELSE INVALID FORMAT                                               000,0000671
076000       MOVE 13 TO ODESY-MSG-TYPE.                                        000,0000671
077000 *                                                                       000,0000692
078000   WRITE-REMOTE.                                                         000,0000692
079000       WRITE ODESY-RECORD-AREA.                                          000,0000692
080000       GO TO MAIN-LOOP.                                                  000,0000912
081000 *                                                                       000,0000928
082000   INVCREC1-CHECK.                                                       000,0000928
083000       MOVE INVC-STOCK-NO TO STOCK-KEY.                                  000,0000928
084000       DISPLAY "INVCREC1-AREA IS " INVCREC1-AREA.                        000,0000961
085000       READ STOCK-FILE INVALID KEY GO TO INVCREC1-ERROR.                 000,0001305
086000       DISPLAY "INVC-STOCK-NO IS " INVC-STOCK-NO.                        000,0001588
087000       IF STOCK-VALID = 0 GO TO INVCREC1-ERROR.                          000,0001932
088000       MOVE 11 TO ODESY-MSG-TYPE.                                        000,0001982
089000       GO TO WRITE-REMOTE.                                               000,0002003
090000 *                                                                       000,0002019
091000   INVCREC1-ERROR.                                                       000,0002019
092000       MOVE "*****" TO INVC-ST-NO-ERRORS.                                000,0002019
093000       MOVE 1 TO ODESY-ERRORS.                                           000,0002093
094000       MOVE 11 TO ODESY-MSG-TYPE.                                        000,0002131
095000       DISPLAY "STOCK-REC    = ".                                        000,0002152
096000       DISPLAY STOCK-REC.                                                000,0002436
097000       GO TO WRITE-REMOTE.                                               000,0002566
098000   END-OF-JOB.                                                           000,0002582


  C O D E     D I C T I O N A R Y
      BYTE LENGTH   CODEFILE RELATIVE DISK ADR
      ...........   ........................
  000 00000323      000007
      00000323      TOTAL CODE

  D A T A     D I C T I O N A R Y
      BYTE LENGTH   CODEFILE RELATIVE DISK ADR
      ...........   ........................
  000 00000392      000003

  S - M A C H I N E    P A R A M E T E R S    ( S C R A T C H P A D )

  LENB - 7, SEGB - 0, DISPB - 10, COPXB - 4, COPB - 22, D.E.F - 341, BDISPB - 12
  BASE RELATIVE ADDRESSES -
    DATA-SEGMENT-0 - 240,COP-TABLE - 42

  P R O G R A M    P A R A M E T E R    B L O C K

  FIRST-EXECUTABLE-INSTRUCTION 0,0
  INTERPRETER-NAME             COBOL     /INTERP
  STATIC-CORE                  3136 BITS
  DYNAMIC-CORE                 0 BITS
  DATA DICTIONARY STARTS AT CODEFILE SEGMENT 2, 1 ENTRY
  CODE DICTIONARY STARTS AT CODEFILE SEGMENT 6, 1 ENTRY
  FILE PARAMETER BLOCKS START AT CODEFILE SEGMENT 9, 2 ENTRIES

***** COMPILATION COMPLETE
ELAPSED TIME - 02 MINUTES, 55 SECONDS, WHICH IS 175 SECONDS
PROCESSOR TIME - 09 SECONDS, WHICH IS 9 SECONDS
PROGRAM REQUIRES 11 DISK SEGMENTS OF 180 BYTES EACH.
MEMORY REQUIREMENTS
  0000323 BYTES - LARGEST CODE SEGMENT
  0000392 BYTES - BASE-TO-LIMIT AREA
  0000315 BYTES - DICTIONARIES AND RUN STRUCTURE
  0000714 BYTES - FILE BUFFERS & FILE INFO AREAS - INCLUDES 129 BYTES (+72 TO 540 IF DISK) FOR EACH FILE
  0001744 BYTES - ESTIMATED MEMORY REQUIRED TO RUN IF ALL FILES OPEN
99 SYMBOLIC RECORDS COMPILED AT 33.900 RECORDS PER ELAPSED MINUTE OR 660.000 RECORDS PER PROCESSOR MINUTE.
```

```
B U R R O U G H S  B1800/B1700 R P G   C O M P I L E R ,  LEVEL -  MARK IX.1

 P R O G R A M   N A M E     ODY2ODEMOO/STOCKINQ.R
DATE COMPILED--/01/27/81     TIME COMPILED--13 10     WITH COMPILER-- DATED  08/21/80 11 18


          01000F*  1         2         3         4         5         6         7         8
          01100F*8901234567890123456789012345678901234567890123456789012345678901234567890
          01200F*
          01300F*     ************************************************************
          01400F*     *                                                          *
          01500F*     *         S T O C K   I N Q U I R Y   P R O G R A M        *
          01600F*     *                                                          *
          01700F*     ************************************************************
          01800F*
          01900F*                  U S E   O F   I N D I C A T O R S
          02000F*
          02100F*          01  DUMMY PRIMARY FILE RECORD
          02200F*          02  STOCK FILE RECORD
          02300F*          03  REMOTE FILE RECORD
          02400F*
          02500F*          10  ODESY REQUEST FOR FORMAT INVCREC1
          02600F*
          02700F*          20  INVALID STOCK NUMBER
          02800F*          21  POSITIVE NON-ZERO STOCK NUMBER
          02900F*          22  EXCEPTION INDICATOR FOR REMOTE FILE WRITE
          03000F*
          03100F*          99  END OF FILE OR EXCEPTION ON REMOTE FILE
          03200F*
          03300F*
          03400F*     ************************************************************
          03500F*     *                                                          *
          03600F*     *       F I L E   S P E C I F I C A T I O N S              *
          03700F*     *                                                          *
          03800F*     ************************************************************
          03900F*
          04000F*  1         2         3         4         5         6         7         8
          04100F*8901234567890123456789012345678901234567890123456789012345678901234567890
        1 04200FDUMMY   IPE F1600  80            DISK
          04300F* FAMILYSTOCKFILE
        2 04400FSTOCK   IC  F 120   6            DISK
          04500F* FAMILYSTATIONS
        3 04600FREMOTE  CD  F 190 190            REMOTE
          04700F*
          04800F*     ************************************************************
          04900F*     *                                                          *
          05000F*     *      T E L E C O M M U N I C A T I O N S   C A R D       *
          05100F*     *                                                          *
          05200F*     ************************************************************

        4 05300IREMOTE    10 1OREMSTAREMLEN
```

RPG Compile Listing (1 of 3)

```
   054001*
   055001*     ****************************************************
   056001*     *                                                  *
   057001*     *          I N P U T   S P E C I F I C A T I O N S *
   058001*     *                                                  *
   059001*     ****************************************************
   060001*
 5 061001IDUMMY    NS  01
 6 062001                                          1   1 FILLER
 7 063001ISTOCK    NS  02
 8 064001                                          1   50STCKNO
 9 065001                                          6   60STKOK             20
10 066001IREMOTE   NS  10   15 CI   16 CN   17 CV
11 067001          AND      18 CC   19 CR   20 CE
12 068001          AND      21 CC   22 C1
13 069001                                          1   200DYTYP
14 070001                                          3   500DYSTA
15 071001                                          6   700DYOPR
16 072001                                          8  1000DYBCH
17 073001                                         11  1400DYREC
18 074001                                         15  18 ODYGRP
19 075001                                         19  22 ODYFMT
20 076001                                         23  2600DYLEN
21 077001                                         27  2800DYERR
22 078001                                         31  350INVBCH
23 079001                                         36  400STKKEY       212020
24 080001                                         41  41 INVSCD
25 081001                                         42  460INVSTR
26 082001                                         47  550INVSQN
27 083001                                         56  56 INVDF
28 084001                                         57  672INVVAL
29 085001                                         68  730INVDAT
30 086001                                         74  740INVRCD
31 087001                                         75  750INVACD
32 088001                                          1  190 ODYMSG
33 089001          NS  03
34 090001                                          1  190 ODYMSG


   091000C*
   092000C*     ****************************************************
   093000C*     *                                                  *
   094000C*     *    C A L C U L A T I O N   S P E C I F I C A T I O N S *
   095000C*     *                                                  *
   096000C*     ****************************************************
   097000C*   1         2         3         4         5         6         7         8
   098000C*8901234567890123456789012345678901234567890123456789012345678901234567890
35 099000C                LOOP      TAG
36 100000C                          SETOF                         202122
37 101000C                          RECV REMOTE                   99  99
38 102000C   99                     GOTO ENDIT
39 103000C  N10                     MOVE 13           ODYTYP
40 104000C   10 21    STKKEY        CHAINSTOCK                    20
41 105000C   10 20                 MOVE 1            ODYERR
42 106000C   10                    MOVE 11           ODYTYP
43 107000C                          SETON                         22
44 108000C                          SEND REMOTE                       99
45 109000C  N99                     GOTO LOOP
46 110000C                ENDIT     TAG
47 111000C                          SETON                         LR


   112000*
   113000*     ****************************************************
   114000*     *                                                  *
   115000*     *        O U T P U T   S P E C I F I C A T I O N S *
   116000*     *                                                  *
   117000*     ****************************************************
   118000*
48 119000REMOTE   E         22
49 119500                           ODYMSG    190
50 120000                           ODYTYPX     2
51 121000                           ODYERRX    28
52 122000                    20                 40 '*****'

DIAGNOSTICS COMPLETE - NO SYNTAX ERRORS
```

RPG Compile Listing (2 of 3)

```
RPG COMPILER LEVEL  MARK IX.1+ DATED 08/21/80

              NON-OVERLAYABLE MEMORY -    1123 BYTES
                  TOTAL FILE SPACE -  2721 BYTES -ASSUMING ALL FILES OPEN-
                  MINIMUM CODE SPACE -   431 BYTES
                                      ------
   PROGRAM DEPENDENT REQUIRED MEMORY -  4275 BYTES
            ESTIMATE OF MCP OVERHEAD -   200 BYTES
                                      ------
*** ESTIMATED MEMORY REQUIRED TO RUN -    4475 BYTES ***

OBJECT PROGRAM REQUIRES 35 DISK SEGMENTS OF 180 BYTES EACH
ELAPSED TIME 517 SECONDS
52 SOURCE CARDS COMPILED AT 6 CARDS PER MINUTE
```

RPG Compile Listing (3 of 3)

```
BURROUGHS B1800/B1700 UPL COMPILER, MARK IX.1 (10/03/80 22:46)    TUESDAY,   1/27/81, 12:17:00 PM

                    ********************************************
                    *                                          *
                    *                                          *
                    *              JOB NUMBER:                 *
                    *                000776                    *
                    *                                          *
                    *                                          *
                    *              OBJECT FILE:                *
                    *         ODY20DEM00/STOCKINQ.U            *
                    *                                          *
                    *                                          *
                    *              CARDS FILE:                 *
                    *         ODY20DEMS/STOCKINQ.U             *
                    *                                          *
                    *                                          *
                    ********************************************

LL  NL  SEQUENCE :SOURCE IMAGE                                                    :  PROCEDURE   SEGMENT     PATCH
 0   0  00002000 :%*************************************************************************:
 0   0  00003000 :%*                                                                        *:
 0   0  00004000 :%*    TITLE: B1000 ODESY                                                  *:
 0   0  00005000 :%*           SAMPLE USER PROGRAM - STOCKINQ                               *:
 0   0  00006000 :%*                                                                        *:
 0   0  00007000 :%*************************************************************************:
 0   0  00008000 :%                                                                         :
 0   0  00009000 :%%%
```

```
0   0   00040000 :DECLARE                                                                                    :
0   0   00041000 :          01 STOCK.REC,                                                                    :
0   0   00042000 :             03 STOCK.NO            CH(5),                                                :
0   0   00043000 :             03 STOCK.VALID         CH(1);                                                :
0   0   00044000 :%
0   0   00045000 :          01 ODESY.RECORD.AREA,
0   0   00046000 :             03 ODESY.MSG.TYPE      CH(2),                                                :
0   0   00047000 :             03 ODESY.STATION       CH(3),                                                :
0   0   00048000 :             03 ODESY.OPERATOR      CH(2),                                                :
0   0   00049000 :             03 ODESY.BATCH         CH(3),                                                :
0   0   00050000 :             03 ODESY.RECORD        CH(4),                                                :
0   0   00051000 :             03 ODESY.GROUP         CH(4),                                                :
0   0   00052000 :             03 ODESY.FORMAT        CH(4),                                                :
0   0   00053000 :             03 ODESY.LENGTH        CH(4),                                                :
0   0   00054000 :             03 ODESY.ERRORS        CH(2),                                                :
0   0   00055000 :             03 FILLER              CH(2),                                                :
0   0   00056000 :             03 ODESY.DATA          CH(160),                                              :
0   0   00057000 :%
0   0   00058000 :          01 INVCREC1.AREA REMAPS ODESY.RECORD.AREA,
0   0   00059000 :             03 FILLER              CH(30),
0   0   00060000 :             03 INVC.BATCH          CH(5),
0   0   00061000 :             03 INVC.STOCK.NO       CH(5),
0   0   00062000 :             03 INVC.STOCK.CODE     CH(1),
0   0   00063000 :             03 INVC.TR.NO          CH(5),
0   0   00064000 :             03 INVC.QUANTITY       CH(9),
0   0   00065000 :             03 INVC.OF             CH(1),
0   0   00066000 :             03 INVC.VALUE          CH(11),
0   0   00067000 :             03 INVC.DATA           CH(6),
0   0   00068000 :             03 INVC.REC.CODE       CH(1),
0   0   00069000 :             03 INVC.AUX.CODE       CH(1);
0   0   00070000 :%
0   0   00071000 :          STOCK.KEY                 CH(5),
0   0   00072000 :          STOCK.ADDR                FIXED;
0   0   00073000 :%
0   0   00074000 :%
0   0   00075000 :PROCEDURE WRITE.REMOTE;
1   0   00076000 :   WRITE STATIONS (ODESY.RECORD.AREA);                                                     : WRITE.REMO
1   0   00077000 :END WRITE.REMOTE;                                                                         : WRITE.REMO
0   0   00078000 :&PAGE
0   0   00079000 :%%%
```

```
  0   0  00134000 :XXXX
```

INQUIRY EXAMPLE 2

Inquiry Example 2 demonstrates some of the more sophisticated inquiry facilities. This example examines selected records from a vendor master file and scans the vendor's outstanding invoices where necessary.

FORMATS AP VEND, AP NAME, AND AP INVC

Format AP VEND is a key data format, format AP NAME is a supply-and-check format, and format AP INVC is a supply data format. All formats refer to the user program APINQ.

DATA DIVISION (COBOL EXAMPLE)

The example shows record areas for the vendor master file, invoice file, and remote file. The record area for the remote file is redefined so that it corresponds with the data for the three formats. Also, there is a station table used to store keys for the vendor master file and the invoice file.

PROCEDURE DIVISION (COBOL EXAMPLE)

During initialization, the vendor master file, invoice file, and remote file are opened, and the station table is set to zeros. The rest of the program is a loop to read the remote file and process the messages received.

If the message is a key data message for format AP VEND, the vendor number is stored in the table as THIS-VEND and NEXT-VEND. No message is sent in reply.

If the message is a supply data message for format AP NAME, NEXT-VEND is examined. If it contains a non-zero value, the vendor record is found and the relevant information is sent to EDIT in a data message. Format AP NAME requires 100 characters of data. If NEXT-VEND is zero, the format name is changed to AP INVC and the first invoice in the invoice file for THIS-VEND is found. The relevant information is sent to EDIT in a data message. Format AP INVC requires 88 characters of data.

If the message is a check data message for format AP NAME, the value in the NEXT VENDOR field is stored in NEXT-VEND. If you have not entered a number, NEXT VENDOR will be blank. A data message is sent in reply, with ODESY-ERRORS = 0.

If the message is a supply data message for format AP INVC, the next invoice for THIS-VEND is found. The relevant information is sent to EDIT in a data message. However, if there are no more invoices for THIS-VEND, the format name is changed to AP VEND and a data message, containing no data, is sent to EDIT.

OPERATION

You may select Inquiry mode or alternatively open a batch in Enter mode to provide a journal. The journal shows all inquiries performed on the files.

After entering the /HELLO and /OPEN commands, enter //VEND.

The AP VEND format is displayed. Enter a vendor number.

The AP VEND data is sent to the user program in a key data message. AP VEND is followed by AP NAME, so that a supply data message is immediately sent to the user program. NEXT-VEND will be non-zero, so the vendor details are supplied in a data message.

The AP NAME format is displayed at the terminal with the vendor details.

If you wish to look at another vendor master record, enter a value for the field NEXT VENDOR. However, if you transmit without changing the data, the first invoice is supplied.

In either case, the AP NAME data is sent to the user program in a check data message. The user program stores NEXT VENDOR as NEXT-VEND in its table and sends a data message in reply, with ODESY-ERRORS = Ø.

The AP NAME format is followed by AP NAME, so another supply data message is immediately sent to the user program. If NEXT-VEND is zero, the format name is changed to AP INVC and the first invoice details are sent to EDIT in a data message.

The AP INVC format is displayed at the terminal with the vendor details.

If you transmit without changing the data, the next invoice is supplied. If you enter //NAME, the vendor details are recalled. You may examine another vendor master record by entering //VEND and then the vendor number.

If you choose to look at all of the invoices, the format will automatically change to AP VEND after the last invoice.

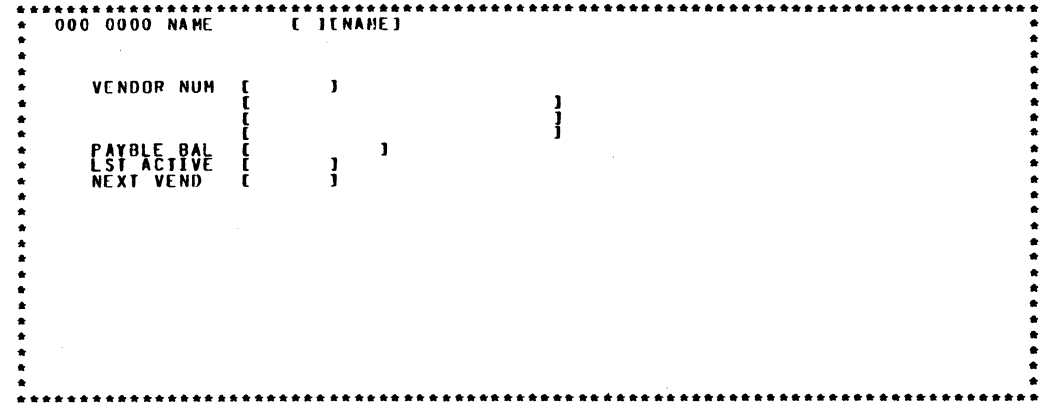
```
B1000 ON-LINE DATA ENTRY SYSTEM        F O R M A T  M A I N T E N A N C E  R E P O R T      TIME 15:22  DATE 01/27/81  PAGE   1
   GROUP NAME  AP                              FILE NAME            NONE                    DATE LAST CHANGED 01/21/81

   RECORD SIZE 180  BLOCKED  1   RECORDS/AREA  500   AREAS 40   ON DISK                          REPORT  DATE FORMAT  AS SYS
   GROUP SIGN CONVENTION     MSD


   FORMAT NAME AP  VEND          NEXT FORMAT AP  NAME    SECURITY  80       VERIFY   KDATA    DATE LAST CHANGED 01/21/81
                                 LINE ADVANCE 3          CURSOR ADVANCE  0
                                                         USER PROGRAM NAME              APINQ
                    ********************************************************************************
                    *  000 0000 VEND      [ ][NAME]                                                  *
                    *                                                                                *
                    *                                                                                *
                    *      VENDOR NUMBER  [      ]                                                   *
                    *                                                                                *
                    *                                                                                *
                    *                                                                                
```

```
B1000 ON-LINE DATA ENTRY SYSTEM        F O R M A T  M A I N T E N A N C E  R E P O R T      TIME 15:22  DATE 01/27/81  PAGE   2

   FORMAT NAME AP  NAME          NEXT FORMAT AP  NAME   SECURITY  80        VERIFY   C-&-S    DATE LAST CHANGED 01/21/81
                                 LINE ADVANCE 3         CURSOR ADVANCE  0
                                                        USER PROGRAM NAME              APINQ
```



DISPLAY SPECIFICATIONS

SEQ	NAME	LENGTH	SPACE ADVANCE BEFORE/AFTER		LINE ADVANCE	HIGHLIGHT	DUP IN	DISP VER
10	VENDOR NUM	6	5	2	1			
20		24	16	1	1			
30		24	16	1	1			
40		24	16	1	1			
50	PAYBLE BAL	10	5	2	1			
60	LST ACTIVE	6	5	2	1			
70	NEXT VEND	6	5	3	0			

OTHER SPECIFICATIONS

SEQ	TYPE	CNS/VAL /RANGE	MAND	DATE	CDV	CROSSFOOT	BATCH TOTALS	JUST IN	OUT POSN	WRITE AFTER	DUP OUT	JUST OUT	PACK OUT	BLANK FILL	SIGN	NAME COL	DATA COL	PRINT AFTER
10	UN															1	12	
20	AN																20	
30	AN																50	
40	AN																80	C

OTHER SPECIFICATIONS

SEQ	TYPE	CNS/VAL /RANGE	MAND	DATE	CDV	CROSSFOOT	BATCH TOTALS	JUST IN	OUT POSN	WRITE AFTER	DUP OUT	JUST OUT	PACK OUT	BLANK FILL	SIGN	NAME COL	DATA COL	PRINT AFTER
50	UN															20	31	
60	UN															50	61	
70	UN							R										C

```
**** WARNING ****  THIS FIELD IS NEITHER OUTPUT NOR PRINTED

**** WARNING ****  THE BUFFER IS NOT WRITTEN AFTER LAST FIELD

**** TOTALS  ****          FIELDS INPUT          7          FIELDS OUTPUT                    0
                           INPUT DATA SIZE     100          CHARACTERS OF CONSTANT DATA      0
                           OUTPUT DATA SIZE    100          CONSTANTS REQUIRED BY EXTRACT    0
                           FIELDS PRINTED        9          MINIMUM SCREEN SIZE OF FORMAT 12 BY 80
```

```
81000 ON-LINE DATA ENTRY SYSTEM        F O R M A T  M A I N T E N A N C E  R E P O R T        TIME 15:22  DATE 01/27/81  PAGE  4

   FORMAT NAME AP  INVC          NEXT FORMAT AP  INVC    SECURITY  80       VERIFY   SUPP     DATE LAST CHANGED 01/21/81
                                 LINE ADVANCE 3          CURSOR ADVANCE  0
                                                                  USER PROGRAM NAME                APINQ
```

```
*****************************************************************************
*  000 0000 INVC      [ ][INVC]                                              *
*                                                                            *
*                                                                            *
*     VENDOR NUM [      ]                                                    *
*     TRAN NUM   [      ] INV NUM   [          ]                           *
*     DATE       [      ] DUE DATE  [      ]                                *
*     AMOUNT [          ]                                                   *
*     PAID   [          ] PAYABLE   [          ]                           *
*            [          ]                                                   *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*                                                                            *
*****************************************************************************
```

DISPLAY SPECIFICATIONS

SEQ	NAME	LENGTH	SPACE BEFORE	ADVANCE/AFTER	LINE ADVANCE	HIGHLIGHT	DUP IN	DISP VER
10	VENDOR NUM	6	5	1	1			
20	TRAN NUM	6	5	3	0			
30	INV NUM	10	1	3	1			
40	DATE	6	5	7	0			
50	DUE DATE	6	1	2	1			
60	AMOUNT	10	5	1	1			
70	PAID	10	5	3	0			
80	PAYABLE	10	1	3	1			
90		24	11	1	0			

OTHER SPECIFICATIONS

SEQ	TYPE	CNS/VAL /RANGE	MAND	DATE	CDV	CROSSFOOT	BATCH TOTALS	JUST IN	OUT POSN	WRITE AFTER	DUP OUT	JUST OUT	PACK OUT	BLANK FILL	SIGN	NAME COL	DATA COL	PRINT AFTER
10	UN																	

**** WARNING **** THIS FIELD IS NEITHER OUTPUT NOR PRINTED

Formats AP VEND, AP NAME, and AP INVC (3 of 4)

Formats AP VEND, AP NAME, and AP INVC (4 of 4)

B1000 ON-LINE DATA ENTRY SYSTEM F O R M A T M A I N T E N A N C E R E P O R T TIME 15:22 DATE 01/27/81 PAGE 5

OTHER SPECIFICATIONS

SEQ	TYPE	CNS/VAL /RANGE	MAND	DATE	CDV	CROSSFOOT	BATCH TOTALS	JUST IN	OUT POSN	WRITE AFTER	DUP OUT	JUST OUT	PACK OUT	BLANK FILL	SIGN	NAME COL	DATA COL	PRINT AFTER
20	UN																20	
30	AN																30	
40	UN															44	49	
50	UN															59	68	C
60	UN															35	42	
70	UN															56	61	
80	UN															75	83	
90	AN																97	C

**** WARNING **** THE BUFFER IS NOT WRITTEN AFTER LAST FIELD

**** TOTALS ****

FIELDS INPUT	9	FIELDS OUTPUT	0
INPUT DATA SIZE	88	CHARACTERS OF CONSTANT DATA	0
OUTPUT DATA SIZE	88	CONSTANTS REQUIRED BY EXTRACT	0
FIELDS PRINTED	13	MINIMUM SCREEN SIZE OF FORMAT	12 BY 80

```
001000 $ CARD CHECK SINGLE CONTROL SUPPRESS
002000   IDENTIFICATION DIVISION.
003000 * ------------------------
004000   PROGRAM-ID. APINQ.
005000   AUTHOR. DATA ENTRY GROUP.
006000   DATE-WRITTEN. JULY 1980.
007000   DATE-COMPILED.
                      TIME 12:10 DATE 01/27/81.
008000 *
009000   ENVIRONMENT DIVISION.
010000 * ---------------------
011000   CONFIGURATION SECTION.
012000   SOURCE-COMPUTER. B-1800.
013000   OBJECT-COMPUTER. B-1800.
014000   INPUT-OUTPUT SECTION.
015000   FILE-CONTROL.
016000       SELECT VENDOR-MASTER ASSIGN TO DISK,
017000              ACCESS MODE IS RANDOM,
018000              ACTUAL KEY IS VENDOR-KEY.
019000       SELECT INVOICE-FILE ASSIGN TO DISK,
020000              ACCESS MODE IS RANDOM,
021000              ACTUAL KEY IS INVOICE-KEY.
022000       SELECT REMOTE-FILE ASSIGN TO REMOTE.
023000 /
024000   DATA DIVISION.
025000 * -------------
026000   FILE SECTION.
027000   FD   VENDOR-MASTER
028000       FILE CONTAINS 2000 BY 500 RECORDS,
029000       BLOCK CONTAINS 20 RECORDS,
030000       RECORD CONTAINS 187 CHARACTERS,
031000       VALUE OF ID IS "APVNMR".
032000   01   VENDOR-REC-AREA.                                          000,0000056
033000        03 VEND-VENDNO                PIC 9(6) COMP.             000,0000056
034000        03 VEND-NAME                  PIC X(24).                 000,0000062
035000        03 VEND-ADDR                  PIC X(24).                 000,0000110
036000        03 VEND-ADDR2                 PIC X(24).                 000,0000158
037000        03 FILLER                     PIC X(16).                 000,0000206
038000        03 VEND-PAYBAL                PIC S9(9) COMP.   (0001)  000,0000238
039000        03 FILLER                     PIC X(35).                 000,0000248
040000        03 VEND-DATE-LA               PIC 9(6).                  000,0000318
041000        03 FILLER                     PIC X(43).                 000,0000330
042000   FD   INVOICE-FILE
043000       FILE CONTAINS 2000 BY 500 RECORDS,
044000       BLOCK CONTAINS 20 RECORDS,
045000       RECORD CONTAINS 104 CHARACTERS,
046000       VALUE OF ID IS "APVNIN".
047000   01   INVOICE-REC-AREA.                                         000,0000416
048000        03 INVC-VENDNO                PIC 9(6) COMP.    (0002)  000,0000416
049000        03 INVC-TRANNO                PIC 9(6) COMP.             000,0000422
050000        03 INVC-INVNO                 PIC X(10).                 000,0000428
051000        03 INVC-DATE                  PIC 9(6).                  000,0000448
052000        03 INVC-DUE-DATE              PIC 9(6).                  000,0000460
053000        03 INVC-AMOUNT                PIC S9(9) COMP.   (0003)  000,0000472
054000        03 INVC-PAID                  PIC S9(9) COMP.            000,0000482
055000        03 INVC-PAYABLE               PIC S9(9) COMP.   (0004)  000,0000492
056000        03 FILLER                     PIC X(19).                 000,0000502
057000        03 INVC-DESC                  PIC X(24).                 000,0000540
058000        03 FILLER                     PIC X(4).
```

```
059000 /                                                                        000.0000588
060000   FD  REMOTE-FILE
061000       VALUE OF ID IS "STATIONS".
062000   01  ODESY-RECORD-AREA.                                          (0005) 000.0000596
063000       03 ODESY-MSG-TYPE              PIC 99.                     (0006) 000.0000596
064000       03 ODESY-STATION               PIC 999.                    (0007) 000.0000600
065000       03 ODESY-OPERATOR              PIC 99.                            000.0000606
066000       03 ODESY-BATCH                 PIC 999.                           000.0000610
067000       03 ODESY-RECORD                PIC 9999.                          000.0000616
068000       03 ODESY-GROUP                 PIC XXXX.                          000.0000624
069000       03 ODESY-FORMAT                PIC XXXX.                   (0008) 000.0000632
070000       03 ODESY-LENGTH                PIC 9999.                   (0009) 000.0000640
071000       03 ODESY-ERRORS                PIC 99.                            000.0000648
072000       03 FILLER                      PIC XX.                            000.0000652
073000       03 ODESY-DATA                  PIC X(160).                 (0010) 000.0000656
074000   01  APVEND-AREA.                                                      000.0000596
075000       03 FILLER                      PIC X(30).                         000.0000596
076000       03 APVEND-VENDNO               PIC 9(6).                   (0011) 000.0000656
077000   01  APNAME-AREA.                                                      000.0000596
078000       03 FILLER                      PIC X(30).                         000.0000596
079000       03 APNAME-VENDNO               PIC 9(6).                   (0012) 000.0000656
080000       03 APNAME-NAME                 PIC X(24).                  (0013) 000.0000668
081000       03 APNAME-ADDR                 PIC X(24).                         000.0000716
082000       03 APNAME-ADDR2                PIC X(24).                         000.0000764
083000       03 APNAME-SPAYBAL              PIC X.                             000.0000812
084000       03 APNAME-PAYBAL               PIC 9(9).                          000.0000814
085000       03 APNAME-DATE                 PIC 9(6).                          000.0000832
086000       03 APNAME-NEXTVEND             PIC 9(6).                          000.0000844
087000   01  APINVC-AREA.                                                      000.0000596
088000       03 FILLER                      PIC X(30).                         000.0000596
089000       03 APINVC-VENDNO               PIC 9(6).                          000.0000656
090000       03 APINVC-TRANNO               PIC 9(6).                          000.0000668
091000       03 APINVC-INVNO                PIC X(10).                         000.0000680
092000       03 APINVC-DATE                 PIC 9(6).                          000.0000700
093000       03 APINVC-DUE-DATE             PIC 9(6).                          000.0000712
094000       03 APINVC-SAMOUNT              PIC X.                             000.0000724
095000       03 APINVC-AMOUNT               PIC 9(9).                          000.0000726
096000       03 APINVC-SPAID                PIC X.                             000.0000744
097000       03 APINVC-PAID                 PIC 9(9).                          000.0000746
098000       03 APINVC-SPAYABLE             PIC X.                             000.0000764
099000       03 APINVC-PAYABLE              PIC 9(9).                          000.0000766
100000       03 APINVC-DESC                 PIC X(24).
101000 *                                                                       000.0000784
102000   WORKING-STORAGE SECTION.
103000   77  VENDOR-KEY                     PIC 9(8) COMP.                     000.0000976
104000   77  INVOICE-KEY                    PIC 9(8) COMP.              (0014) 000.0000984
105000   77  I                              PIC 99 COMP.                (0015) 000.0000992
106000   01  STATION-TABLE.                                                    000.0000994
107000       03 STATION-ENTRY  OCCURS 10 TIMES.                                000.0000994
108000          05 THIS-VEND                PIC 9(6) COMP.              (0016) 000.0000994
109000          05 NEXT-VEND                PIC 9(6) COMP.              (0018) 000.0001000
110000          05 THIS-INV                 PIC 9(8) COMP.
```

```
111000 /                                                                        (0020) 000.0001006
112000   PROCEDURE DIVISION.
113000 * -------------------
114000   INITIALIZE.                                                                   000.0000000
115000       OPEN INPUT VENDOR-MASTER.                                                 000.0000000
116000       OPEN INPUT INVOICE-FILE.                                                  000.0000000
117000       OPEN I-O REMOTE-FILE.                                                     000.0000084
118000       MOVE 1 TO I.                                                              000.0000168
119000   INIT-STATION-TABLE-LOOP.                                                      000.0000252
120000       MOVE 0 TO THIS-VEND(I).                                                   000.0000270
121000       MOVE 0 TO NEXT-VEND(I).                                                   000.0000270
122000       MOVE 0 TO THIS-INV(I).                                                    000.0000289
123000       ADD 1 TO I.                                                               000.0000308
124000       IF I < 11 GO TO INIT-STATION-TABLE-LOOP.                                  000.0000327
125000   MAIN-LOOP.                                                                    000.0000341
126000       READ REMOTE-FILE AT END STOP RUN.                                         000.0000380
127000       IF ODESY-GROUP = "AP" GO TO AP-CHECK.                                     000.0000380
128000   INVALID-FORMAT.                                                               000.0000720
129000       DISPLAY "INVALID FORMAT".                                                 000.0000790
130000       MOVE 13 TO ODESY-MSG-TYPE.                                                000.0000790
131000       WRITE ODESY-RECORD-AREA.                                                  000.0001079
132000       GO TO MAIN-LOOP.                                                          000.0001101
133000   INVALID-KEY.                                                                  000.0001327
134000       DISPLAY "INVALID KEY".                                                    000.0001344
135000       MOVE 12 TO ODESY-MSG-TYPE.                                                000.0001344
136000       WRITE ODESY-RECORD-AREA.                                                  000.0001609
137000       GO TO MAIN-LOOP.                                                          000.0001631
138000   WRITE-REMOTE.                                                                 000.0001857
139000       MOVE 11 TO ODESY-MSG-TYPE.                                                000.0001874
140000       WRITE ODESY-RECORD-AREA.                                                  000.0001874
141000       GO TO MAIN-LOOP.                                                          000.0001896
142000   AP-CHECK.                                                                     000.0002122
143000       IF ODESY-FORMAT = "VEND" GO TO APVEND-KEYDATA.                            000.0002139
144000       IF THIS-VEND(ODESY-STATION) = 0 GO TO INVALID-KEY.                        000.0002139
145000       IF ODESY-FORMAT = "NAME" AND ODESY-MSG-TYPE = 2                           000.0002202
146000           GO TO APNAME-SUPPLY.                                                  000.0002238
147000       IF ODESY-FORMAT = "NAME" AND ODESY-MSG-TYPE = 3                           000.0002301
148000           GO TO APNAME-CHECK.                                                   000.0002353
149000       IF ODESY-FORMAT = "INVC"                                                  000.0002416
150000           GO TO APINVC-SUPPLY.                                                  000.0002468
151000       GO TO INVALID-FORMAT.                                                     000.0002468
                                                                                      000.0002531
```

```
152000 /                                                                        000,0002548
153000   APVEND-KEYDATA.                                                        000,0002548
154000       DISPLAY "APVEND KEYDATA".                                          000,0002548
155000       MOVE APVEND-VENDNO TO THIS-VEND(ODESY-STATION).                    000,0002837
156000       MOVE APVEND-VENDNO TO NEXT-VEND(ODESY-STATION).                    000,0002856
157000       MOVE 0 TO THIS-INV(ODESY-STATION).                                 000,0002875
158000       GO TO MAIN-LOOP.                                                   000,0002894
159000   APNAME-SUPPLY.                                                         000,0002911
160000       DISPLAY "APNAME SUPPLY".                                           000,0002911
161000       IF NEXT-VEND(ODESY-STATION) = 0                                    000,0003192
162000 *        THEN SUPPLY FIRST INVOICE FOR THIS VENDOR                      000,0003192
163000           GO TO APNAME-FIRST-INVOICE.                                    000,0003192
164000 *     ELSE SUPPLY NEXT VENDOR DETAILS                                   000,0003228
165000       MOVE NEXT-VEND(ODESY-STATION) TO THIS-VEND(ODESY-STATION).         000,0003228
166000       MOVE THIS-VEND(ODESY-STATION) TO VENDOR-KEY.                       000,0003252
167000       READ VENDOR-MASTER INVALID KEY GO TO MISSING-VENDOR.               000,0003294
168000       MOVE SPACES TO ODESY-DATA.                                         000,0003589
169000       MOVE VEND-VENDNO TO APNAME-VENDNO.                                 000,0003603
170000       MOVE VEND-NAME TO APNAME-NAME.                                     000,0003640
171000       MOVE VEND-ADDR TO APNAME-ADDR.                                     000,0003677
172000       MOVE VEND-ADDR2 TO APNAME-ADDR2                                    000,0003737
173000       MOVE VEND-PAYBAL TO APNAME-PAYBAL                                  000,0003737
174000       IF VEND-PAYBAL < 0 MOVE "-" TO APNAME-SPAYBAL.                     000,0003797
175000       MOVE VEND-DATE-LA TO APNAME-DATE.                                  000,0003910
176000       MOVE 100 TO ODESY-LENGTH.                                          000,0003970
177000       GO TO WRITE-REMOTE.                                                000,0003996
178000   MISSING-VENDOR.                                                        000,0004013
179000       DISPLAY "MISSING VENDOR".                                          000,0004013
180000       MOVE SPACES TO ODESY-DATA.                                         000,0004302
181000       MOVE THIS-VEND(ODESY-STATION) TO APNAME-VENDNO.                    000,0004316
182000       MOVE "MISSING VENDOR" TO APNAME-NAME.                              000,0004335
183000       MOVE 100 TO ODESY-LENGTH.                                          000,0004469
184000       GO TO WRITE-REMOTE.                                                000,0004495
185000   APNAME-FIRST-INVOICE.                                                  000,0004512
186000       MOVE THIS-VEND(ODESY-STATION) TO NEXT-VEND(ODESY-STATION).         000,0004512
187000 *     CHANGE FORMAT NAME                                                 000,0004536
188000       MOVE "INVC" TO ODESY-FORMAT.                                       000,0004536
189000       MOVE 0 TO THIS-INV(ODESY-STATION).                                 000,0004582
190000       GO TO APINVC-SUPPLY.                                               000,0004601
191000   APNAME-CHECK.                                                          000,0004618
192000       DISPLAY "APNAME CHECK".                                            000,0004618
193000       MOVE APNAME-NEXTVEND TO NEXT-VEND(ODESY-STATION).                  000,0004891
194000       GO TO WRITE-REMOTE.                                                000,0004933
195000 /                                                                        000,0004950
196000   APINVC-SUPPLY.                                                         000,0004950
197000       DISPLAY "APINVC SUPPLY".                                           000,0004950
198000       MOVE THIS-INV(ODESY-STATION) TO INVOICE-KEY.                       000,0005231
199000   READ-INVOICE.                                                          000,0005250
200000       ADD 1 TO INVOICE-KEY.                                              000,0005250
201000       READ INVOICE-FILE INVALID KEY GO TO LAST-INVOICE.                  000,0005264
202000       IF THIS-VEND(ODESY-STATION) NOT = INVC-VENDNO                      000,0005536
203000 *          THEN READ NEXT INVOICE                                        000,0005536
204000           GO TO READ-INVOICE.                                            000,0005536
205000 *     ELSE SUPPLY INVOICE DETAILS                                        000,0005572
206000       MOVE INVOICE-KEY TO THIS-INV(ODESY-STATION).                       000,0005572
207000       MOVE SPACES TO ODESY-DATA.                                         000,0005591
208000       MOVE INVC-VENDNO TO APINVC-VENDNO.                                 000,0005605
209000       MOVE INVC-TRANNO TO APINVC-TRANNO.                                 000,0005642
210000       MOVE INVC-INVNO TO APINVC-INVNO.                                   000,0005702
211000       MOVE INVC-DATE TO APINVC-DATE.                                     000,0005762
212000       MOVE INVC-DUE-DATE TO APINVC-DUE-DATE.                             000,0005822
213000       MOVE INVC-AMOUNT TO APINVC-AMOUNT.                                 000,0005882
214000       IF INVC-AMOUNT < 0 MOVE "-" TO APINVC-SAMOUNT.                     000,0005919
215000       MOVE INVC-PAYABLE TO APINVC-PAYABLE.                               000,0005995
216000       IF INVC-PAYABLE < 0 MOVE "-" TO APINVC-SPAYABLE.                   000,0006032
217000       MOVE INVC-DESC TO APINVC-DESC.                                     000,0006108
218000       MOVE 88 TO ODESY-LENGTH.                                           000,0006168
219000       GO TO WRITE-REMOTE.                                                000,0006190
220000   LAST-INVOICE.                                                          000,0006207
221000       MOVE 0 TO THIS-INV(ODESY-STATION).                                 000,0006207
222000 *     CHANGE FORMAT NAME                                                 000,0006226
223000       MOVE "VEND" TO ODESY-FORMAT.                                       000,0006226
224000       GO TO WRITE-REMOTE.                                                000,0006272
225000   END-OF-JOB.                                                            000,0006289
```

```
C O D E     D I C T I O N A R Y
     BYTE LENGTH   CODEFILE RELATIVE DISK ADR
     ...........   ..........................
000 00000787       000009
     00000787      TOTAL CODE

D A T A     D I C T I O N A R Y
     BYTE LENGTH   CODEFILE RELATIVE DISK ADR
     ...........   ..........................
000 00000730       000003

S - M A C H I N E     P A R A M E T E R S     ( S C R A T C H P A D )

LENB - 8, SEGB - 0, DISPB - 11, COPXB - 5, COPB - 23, D.E.F - 430, BDISPB - 13
BASE RELATIVE ADDRESSES -
  DATA-SEGMENT-0 - 688,COP-TABLE - 41

P R O G R A M     P A R A M E T E R     B L O C K

FIRST-EXECUTABLE-INSTRUCTION 0,0
INTERPRETER-NAME              COBOL      /INTERP
STATIC-CORE                   5840 BITS
DYNAMIC-CORE                  0 BITS
DATA DICTIONARY STARTS AT CODEFILE SEGMENT 2, 1 ENTRY
CODE DICTIONARY STARTS AT CODEFILE SEGMENT 8, 1 ENTRY
FILE PARAMETER BLOCKS START AT CODEFILE SEGMENT 14, 3 ENTRIES

***** COMPILATION COMPLETE
ELAPSED TIME - 04 MINUTES, 25 SECONDS, WHICH IS 265 SECONDS
PROCESSOR TIME - 26 SECONDS, WHICH IS 26 SECONDS
PROGRAM REQUIRES 17 DISK SEGMENTS OF 180 BYTES EACH.
MEMORY REQUIREMENTS
  0000787 BYTES - LARGEST CODE SEGMENT
  0000730 BYTES - BASE-TO-LIMIT AREA
  0000325 BYTES - DICTIONARIES AND RUN STRUCTURE
  0024162 BYTES - FILE BUFFERS & FILE INFO AREAS - INCLUDES 129 BYTES (+72 TO 540 IF DISK) FOR EACH FILE
  0026004 BYTES - ESTIMATED MEMORY REQUIRED TO RUN IF ALL FILES OPEN
226 SYMBOLIC RECORDS COMPILED AT 51.120 RECORDS PER ELAPSED MINUTE OR 521.520 RECORDS PER PROCESSOR MINUTE.
```

```
B U R R O U G H S  B1800/B1700 R P G   C O M P I L E R ,   LEVEL -  MARK IX.1

 P R O G R A M   N A M E     ODY2ODEM00/APINQ.R
DATE COMPILED--/01/27/81    TIME COMPILED--13 47    WITH COMPILER-- DATED  08/21/80 11 18


          01000F*  1         2         3         4         5         6         7         8
          01100F*8901234567890123456789012345678901234567890123456789012345678901234567890
          01200F*
          01300F*      ************************************************************
          01400F*      *                                                          *
          01500F*      *              A P    I N Q U I R Y   P R O G R A M        *
          01600F*      *                                                          *
          01700F*      ************************************************************
          01800F*
          01900F*                  U S E   O F   I N D I C A T O R S
          02000F*
          02100F*          01  DUMMY PRIMARY FILE RECORD
          02200F*          02  VENDOR MASTER FILE RECORD
          02300F*          03  INVOICE FILE RECORD
          02400F*          04  STATIONS (ODESY) FILE RECORD
          02500F*
          02600F*          10  GROUP = "AP" FORMAT = "VEND"
          02700F*          11  GROUP = "AP" FORMAT = "NAME" MSG.TYPE = 02  SUPPLY
          02800F*          12  GROUP = "AP" FORMAT = "NAME" MSG.TYPE = 03  CHECK
          02900F*          13  GROUP = "AP" FORMAT = "INVC"
          03000F*          14  GROUP = "AP"
          03100F*
          03200F*          20  INVALID KEY
          03300F*          30  SUPPLY VENDOR DATA
          03400F*          31  NEG SIGN TO APNAME.PAYBAL
          03500F*          40  EOF VENDMSTR
          03600F*          50  EOF INVOICE
          03700F*          51  SUPPLY INVOICE DETAILS
          03800F*          52  NEG SIGN AMOUNT
          03900F*          53  NEG SIGN PAYBAL
          04000F*          60  SEND TO TERMINAL ODESY HEADER
          04100F*          61  SEND TO TERMINAL ODESY HEADER & VENDOR REC
          04200F*          62  SEND TO TERMINAL ODESY HEADER & INVOICE REC
          04300F*          63  SEND TO TERMINAL ODESY HEADER & "MISSING VENDOR" MSG
          04400F*
          04500F*      ************************************************************
          04600F*      *                                                          *
          04700F*      *       F I L E   S P E C I F I C A T I O N S              *
          04800F*      *                                                          *
          04900F*      ************************************************************
          05000F*
          05100F*  1         2         3         4         5         6         7         8
          05200F*8901234567890123456789012345678901234567890123456789012345678901234567890
        1 05300FDUMMY    IPE F1600  80            DISK
        2 05400FVENDMSTRIC  F3680 184             DISK
        3 05500FINVOICE IC  F2160 108             DISK
        4 05600FSTATIONSCD  F 190 190             REMOTE
```

RPG Compile Listing (1 of 6)

```
  058ØØE*
  059ØØE*     ************************************************************
  06ØØØE*     *                                                          *
  061ØØE*     *      E X T E N S I O N S   S P E C I F I C A T I O N S   *
  062ØØE*     *                                                          *
  063ØØE*     ************************************************************
  064ØØE*
  065ØØE* STATION TABLE
5 066ØØE                          TVD         10  6 0
6 067ØØE                          NVD         10  6 0
7 068ØØE                          TIV         10  8 0

  069ØØI*
  07ØØØI*     ************************************************************
  071ØØI*     *                                                          *
  072ØØI*     *      T E L E C O M M U N I C A T I O N S   C A R D       *
  073ØØI*     *                                                          *
  074ØØI*     ************************************************************
  075ØØI*   1         2         3         4         5         6         7         8
  076ØØI*8901234567890123456789012345678901234567890123456789012345678901234567890
8 077ØØITSTATIONS   10 1ØREMSTAREMLEN
```

RPG Compile Listing (2 of 6)

```
     *
     *****************************************************************
     *                                                               *
     *                  I N P U T   S P E C I F I C A T I O N S      *
     *                                                               *
     *****************************************************************
     *
     *  1         2         3         4         5         6         7         8
     *890123456789012345678901234567890123456789012345678901234567890123456789
  9  IDUMMY    NS  01
 10  I                                              1  80 DREC
 11  IVENDMSTRNS  02
 12  I                                              1   6OVVNDNO
 13  I                                              7  30 VNAME
 14  I                                             31  54 VADDR
 15  I                                             55  78 VADDR2
 16  I                                             95 1030VPYBAL
 17  I                                            139 1440VDATLA
     * INVOICE FILE
 18  IINVOICE NS  03
 19  I                                              1   6OIVNDNO
 20  I                                              7  12OITRNNO
 21  I                                             13  22OIIVNNO
 22  I                                             23  28OIDATE
 23  I                                             29  34OIDUEDT
 24  I                                             35  43OIAMT
 25  I                                             44  52OIPAID
 26  I                                             53  61OIPYBAL
 27  I                                             81 104 IDESC
     * REMOTE FILE STATIONS
     * CHECK FOR GROUP AP AND FORMAT VEND
 28  ISTATIONSNS  10  15 CA  16 CP  19 CV
 29  I        AND     20 CE  21 CN  22 CD
 30  I        OR   11 01 CO  02 C2  15 CA
 31  I        AND     16 CP  19 CN  20 CA
 32  I        AND     21 CM  22 CE
 33  I        OR   12 01 CO  02 C3  15 CA
 34  I        AND     16 CP  19 CN  20 CA
 35  I        AND     21 CM  22 CE
 36  I        OR   13  15 CA  16 CP  19 CI
 37  I        AND     20 CN  21 CV  22 CC
 38  I                                              1   20ODYTYP
 39  I                                              3   50ST
 40  I                                              6   70ODYOPR
 41  I                                              8  100ODYBCH
 42  I                                             11  140ODYREC
 43  I                                             15  18 ODYGRP
 44  I                                             19  22 ODYFMT
 45  I                                             23  26OODYLEN
 46  I                                             27  28OODYERR
 47  I                                              1  30 ODYMSG
     * APVEND RECORD
 48  I                                            125 130OANNXVD
 49  I                                             31  36OAVVNDN
 50  I        NS  04
 51  I                                              1 130 BS
     *
```

RPG Compile Listing (3 of 6)

```
    160000C*
    161000C*      ************************************************************
    162000C*      *                                                          *
    163000C*      *    C A L C U L A T I O N    S P E C I F I C A T I O N S  *
    164000C*      *                                                          *
    165000C*      ************************************************************
    166000C*  1         2         3         4         5         6         7         8
    167000C*890123456789012345678901234567890123456789012345678901234567890123456789
 52 168000C              LOOP      TAG
 53 169000C                        SETOF                           010203
 54 170000C                        SETOF                           041011
 55 171000C                        SETOF                           121330
 56 172000C                        SETOF                           314050
 57 173000C                        SETOF                           515253
 58 174000C                        SETOF                           606162OUTPUT INDICATORS
 59 175000C                        SETOF                           99
 60 176000C                        RECV STATIONS                   99  99
 61 177000C   99                   GOTO ENDII                          IF EOF,TERMINATE
    178000C* INVALID FORMAT (GROUP NOT = "AP")
 62 179000C   04                   MOVE 13         ODYTYP
 63 180000C   04                   SETON                           60
 64 181000C   04                   SEND STATIONS
 65 181010C   04                   EXCPT
 66 182000C   04                   GOTO LOOP
    183000C* APVEND-KEYDATA (GROUP = "AP" FORMAT = "VEND")
 67 184000C   10                   MOVE AVVNDN     TVD,ST              LOAD STATIONS
 68 185000C   10                   MOVE AVVNDN     NVD,ST              TABLE
 69 186000C   10                   MOVE 0          TIV,ST
 70 187000C   10                   GOTO LOOP
 71 188000C             TVD,ST     COMP 0                          20
    189000C* INVALID KEY
 72 190000C   20                   MOVE 12         ODYTYP
 73 191000C   20                   SETON                           60
 74 192000C   20                   SEND STATIONS
 75 192010C   20                   EXCPT
 76 193000C   20                   GOTO LOOP
    194000C* APNAME-SUPPLY  (GROUP = "AP" FORMAT = "NAME")
 77 195000C       11    NVD,ST     COMP 0                          30SUPPLY DATA
    196000C* FIRST INVOICE
 78 197000C       11 30            MOVE TVD,ST     NVD,ST
 79 198000C       11 30            MOVE 'INVC'     ODYFMT
 80 199000C       11 30            MOVE 0          TIV,ST
 81 200000C       11 30            MOVE TIV,ST     IKEY    50          APINVC SUPPLY
 82 201000C       11 30            EXSR READI                          CALL READ INV
 83 202000C       11 30            GOTO LOOP
    203000C* END FIRST INVOICE
 84 204000C       11               MOVE NVD,ST     TVD,ST              ELSE APNAME SUP
 85 205000C       11               MOVE TVD,ST     VKEY    50
 86 206000C       11    VKEY       CHAINVENDMSTR                   40    READ VENDORFILE
    207000C* IF EOF, SEND "MISSING VENDOR" MESSAGE BACK TO STATION
 87 208000C       11 40            EXSR MISSVN
 88 209000C       11 40            GOTO LOOP
 89 219000C       11               SETON                           61    SEND HEADER,
 90 220000C       11               SEND STATIONS                       99 VENDOR REC
 91 220010C       11               EXCPT
 92 221000C       11               GOTO LOOP
    222000C* END APNAME-SUPPLY PROCEDURE
    223000C* BEGIN APNAME-CHECK
 93 224000C       12               MOVE ANNXVD     NVD,ST              APNAME NEXTVEND
 94 225000C       12               MOVE 11         ODYTYP
 95 226000C       12               SETON                           60    SEND ODESY
 96 227000C       12               SEND STATIONS                       99 HEADER
 97 227010C       12               EXCPT
 98 228000C       12               GOTO LOOP
    229000C* END APNAME-CHECK PRODEDURE
    230000C* BEGIN APINVC-SUPPLY (GROUP = "AP" FORMAT = "INVC")
 99 231000C   13                   MOVE TVD,ST     IKEY    50
100 232000C   13                   EXSR READI                          CALL READI
101 233000C   N99                  GOTO LOOP
102 234000C             ENDII      TAG
103 235000C                        SETON                           LR
    236000C**************
    237000C* SUBROUTINES *
    238000C**************
    239000C* MISSING VENDOR
104 240000CSR           MISSVN     BEGSR
105 244000CSR                      SETON                           63    SEND ODESY
106 245000CSR                      SEND STATIONS                       99 HEADER
107 245010CSR                      EXCPT
108 246000CSR                      ENDSR
    247000C* READ INVOICE
109 248000CSR           READI      BEGSR
110 249000CSR           IKEY       ADD  1          IKEY
111 250000CSR           IKEY       CHAININVOICE                    50
112 251000CSR 50                   MOVE 0          TIV,ST              LAST INVOICE
113 252000CSR 50                   MOVE 'VEND'     ODYFMT
114 253000CSR 50                   MOVE 11         ODYTYP
115 254000CSR 50                   SETON                           60
116 255000CSR 50                   SEND STATIONS                       99
117 255010CSR 50                   EXCPT
118 255500CSR 50                   GOTO ENDRI
119 256000CSR 50         TVD,ST    COMP IVNDNO                     51
120 256500CSRN51                   GOTO ENDRI
121 257000CSR 51                   MOVE IKEY       TIV,ST              SUP INV DETAILS
122 272000CSR 51                   SETON                           62      SEND ODESY
123 273000CSR 51                   SEND STATIONS                           MSG,INV REC
124 273010CSR 51                   EXCPT
125 273500CSR           ENDRI      TAG
126 274000CSR                      ENDSR
    275000C* END READ INVOICE
```

RPG Compile Listing (4 of 6)

```
     276000*
     277000*     ************************************************************
     278000*     *                                                          *
     279000*     *          O U T P U T   S P E C I F I C A T I O N S       *
     280000*     *                                                          *
     281000*     ************************************************************
     282000*
127  283000STATIONSE         60
128  284000                             ODYMSG    30
129  285000                             ODYTYPX    2
130  285500           E       61
131  286000                             ODYMSG    30
132  287000                                        2 '11'
133  288000                                       26 '0100'
134  289000                             VVNDNOX   36
135  290000                             VNAME     60
136  291000                             VADDR     84
137  292000                             VADDR2   108
138  292500                             VPYBALL  118
139  293000                             VDATLAX  124
140  293500           E       62
141  294000                             ODYMSG    30
142  295000                                        2 '11'
143  296000                                       26 '0088'
144  297000                             IVNDNOX   36
145  298000                             IIRNNOX   42
146  299000                             IIVNNOX   52
147  300000                             IDATE_X   58
148  301000                             IDUEDTX   64
149  302000                             IAMT__L   74
150  303000                             IPAID_L   84
151  304000                             IPYBALL   94
152  305000                             IDESC    118
153  305500           E       63
154  306000                             ODYMSG    30
155  307000                                        2 '11'
156  308000                                       26 '0100'
157  309000                             TVD,STX   36
158  310000                                       60 'MISSING VENDOR'

DIAGNOSTICS COMPLETE - NO SYNTAX ERRORS
```

RPG Compile Listing (5 of 6)

```
RPG COMPILER LEVEL  MARK IX.1, DATED 08/21/80

              NON-OVERLAYABLE MEMORY -    1589 BYTES
                  TOTAL FILE SPACE -   8771 BYTES -ASSUMING ALL FILES OPEN-
                 MINIMUM CODE SPACE -    698 BYTES
                                     -------
   PROGRAM DEPENDENT REQUIRED MEMORY - 11058 BYTES
            ESTIMATE OF MCP OVERHEAD -    241 BYTES
                                     -------
*** ESTIMATED MEMORY REQUIRED TO RUN -   11299 BYTES ***

OBJECT PROGRAM REQUIRES 51 DISK SEGMENTS OF 180 BYTES EACH
ELAPSED TIME 856 SECONDS
158 SOURCE CARDS COMPILED AT 11 CARDS PER MINUTE
```

RPG Compile Listing (6 of 6)

```
                    ********************************************
                    *                                          *
                    *                                          *
                    *              JOB NUMBER:                 *
                    *                 000777                   *
                    *                                          *
                    *                                          *
                    *                                          *
                    *            OBJECT FILE:                  *
                    *         ODY20DEM00/APINQ.U               *
                    *                                          *
                    *                                          *
                    *            CARDS FILE:                   *
                    *         ODY20DEMS/APINQ.U                *
                    *                                          *
                    *                                          *
                    ********************************************
```

```
LL  NL  SEQUENCE :SOURCE IMAGE                                                                    :  PROCEDURE   SEGMENT     PATCH
 0   0  00001000 :&LIST USEDOTS SUPPRESS                                                          :
 0   0  00002000 :%*************************************************************************:
 0   0  00003000 :%*                                                                         *:
 0   0  00004000 :%*     TITLE : B1000 ODESY                                                 *:
 0   0  00005000 :%*             SAMPLE USER PROGRAM - APINQ                                 *:
 0   0  00006000 :%*                                                                         *:
 0   0  00007000 :%*************************************************************************:
 0   0  00008000 :%                                                                          :
 0   0  00009000 :%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%:
 0   0  00010000 :%                                                                         %:
 0   0  00011000 :%     PURPOSE    : TO DEMONSTRATE SOME OF THE MORE SOPHISTICATED          %:
 0   0  00012000 :%                  INQUIRY FACILITIES OFFERED BY ODESY.                   %:
 0   0  00013000 :%                                                                         %:
 0   0  00014000 :%     INPUT      : ODESY.RECORD.AREA FROM THE EDIT PROGRAM,               %:
 0   0  00015000 :%                  VENDOR MASTER FILE,                                    %:
 0   0  00016000 :%                  INVOICE FILE.                                          %:
 0   0  00017000 :%                                                                         %:
 0   0  00018000 :%     OUTPUT     : ODESY.RECORD.AREA                                      %:
 0   0  00019000 :%                                                                         %:
 0   0  00020000 :%     PROCESS    : READ THE STATIONS FILE FOR INPUT. IF A "VEND"          %:
 0   0  00021000 :%                  FORMAT IS READ, THEN SET UP THE VENDOR POINTERS. IF    %:
 0   0  00022000 :%                  A "NAME" FORMAT IS READ, THEN EITHER SUPPLY VENDOR     %:
 0   0  00023000 :%                  INFORMATION FROM THE VENDOR MASTER FILE, OR CHECK      %:
 0   0  00024000 :%                  THE DATA KEYED IN DEPENDING ON THE ODESY.MSG.TYPE.     %:
 0   0  00025000 :%                  IF A "INVC" FORMAT IS READ, THEN SUPPLY INFORMATION    %:
 0   0  00026000 :%                  FROM THE INVOICE FILE. EDIT WILL TERMINATE THIS        %:
 0   0  00027000 :%                  PROGRAM.                                               %:
 0   0  00028000 :%                                                                         %:
 0   0  00029000 :%     ASSUMPTIONS: VENDOR MASTER FILE CONTAINS ALL VALID VENDOR          %:
 0   0  00030000 :%                  RECORDS KEYED BY VENDOR NUMBER. THE INVOICE FILE       %:
 0   0  00031000 :%                  SHOULD CONTAIN INVOICES AND THE PROGRAM IS STARTED     %:
 0   0  00032000 :%                  UP BY EDIT.                                            %:
 0   0  00033000 :%                                                                         %:
 0   0  00034000 :%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%%:
 0   0  00035000 :%                                                                          :
 0   0  00036000 :DEFINE                                                                     :
 0   0  00037000 :        DEC AS #DECIMAL#,                                                  :
 0   0  00038000 :        BIN AS #BINARY#,                                                   :
 0   0  00039000 :        SPACES AS # " " #,                                                 :
 0   0  00040000 :        CH AS #CHARACTER#;                                                 :
 0   0  00041000 :&PAGE                                                                      :
```

```
0   0  00042000 :FILE VENDMASTER (DEVICE = DISK RANDOM, RECORDS = 184/20, LOCK,
0   0  00043000 :                AREAS = 2/500, LABEL = "VENDMASTER");
0   0  00044000 :FILE INVOICE    (DEVICE = DISK RANDOM, RECORDS = 108/20, LOCK,
0   0  00045000 :                AREAS = 2/500, LABEL = "INVOICE");
0   0  00046000 :FILE STATIONS   (DEVICE = REMOTE);
0   0  00047000 :%
0   0  00048000 :DECLARE
0   0  00049000 :          01 VENDOR.REC.AREA,
0   0  00050000 :             03 VEND.VENDNO              CH(6),
0   0  00051000 :             03 VEND.NAME                CH(24),
0   0  00052000 :             03 VEND.ADDR                CH(24),
0   0  00053000 :             03 VEND.ADDR2               CH(24),
0   0  00054000 :             03 FILLER                   CH(16),
0   0  00055000 :             03 VEND.PAYBAL              CH(9),
0   0  00056000 :             03 FILLER                   CH(35),
0   0  00057000 :             03 VEND.DATE.LA             CH(6),
0   0  00058000 :             03 FILLER                   CH(43),
0   0  00059000 :%
0   0  00060000 :          01 INVOICE.REC.AREA,
0   0  00061000 :             03 INVC.VENDNO              CH(6),
0   0  00062000 :             03 INVC.TRANNO              CH(6),
0   0  00063000 :             03 INVC.INVNO               CH(10),
0   0  00064000 :             03 INVC.DATE                CH(6),
0   0  00065000 :             03 INVC.DUE.DATE            CH(6),
0   0  00066000 :             03 INVC.AMOUNT              CH(9),
0   0  00067000 :             03 INVC.PAID                CH(9),
0   0  00068000 :             03 INVC.PAYABLE             CH(9),
0   0  00069000 :             03 FILLER                   CH(19),
0   0  00070000 :             03 INVC.DESC                CH(24),
0   0  00071000 :             03 FILLER                   CH(4),
0   0  00072000 :&PAGE


0   0  00073000 :          01 ODESY.RECORD.AREA,
0   0  00074000 :             03 ODESY.MSG.TYPE           CH(2),% NUMERIC
0   0  00075000 :             03 ODESY.STATION            CH(3),% NUM
0   0  00076000 :             03 ODESY.OPERATOR           CH(2),% NUM
0   0  00077000 :             03 ODESY.BATCH              CH(3),% NUM
0   0  00078000 :             03 ODESY.RECORD             CH(4),% NUM
0   0  00079000 :             03 ODESY.GROUP              CH(4),%
0   0  00080000 :             03 ODESY.FORMAT             CH(4),%
0   0  00081000 :             03 ODESY.LENGTH             CH(4),% NUM
0   0  00082000 :             03 ODESY.ERRORS             CH(2),% NUM
0   0  00083000 :             03 FILLER                   CH(2),%
0   0  00084000 :             03 ODESY.DATA               CH(160),
0   0  00085000 :%
0   0  00086000 :          01 APVEND.DATA REMAPS ODESY.RECORD.AREA,
0   0  00087000 :             03 FILLER                   CH(30),
0   0  00088000 :             03 APVEND.VENDNO            CH(6),
0   0  00089000 :%
0   0  00090000 :          01 APNAME.AREA REMAPS ODESY.RECORD.AREA,
0   0  00091000 :             03 FILLER                   CH(30),
0   0  00092000 :             03 APNAME.VENDNO            CH(6),
0   0  00093000 :             03 APNAME.NAME              CH(24),
0   0  00094000 :             03 APNAME.ADDR              CH(24),
0   0  00095000 :             03 APNAME.ADDR2             CH(24),
0   0  00096000 :             03 APNAME.SPAYBAL           CH(1),
0   0  00097000 :             03 APNAME.PAYBAL            CH(9),
0   0  00098000 :             03 APNAME.DATE              CH(6),% NUM
0   0  00099000 :             03 APNAME.NEXTVEND          CH(6),% NUM
0   0  00100000 :%
0   0  00101000 :          01 APINVC.AREA REMAPS ODESY.RECORD.AREA,
0   0  00102000 :             03 FILLER                   CH(30),
0   0  00103000 :             03 APINVC.VENDNO            CH(6),% NUM
0   0  00104000 :             03 APINVC.TRANNO            CH(6),% NUM
0   0  00105000 :             03 APINVC.INVNO             CH(10),%NUM
0   0  00106000 :             03 APINVC.DATE              CH(6),% NUM
0   0  00107000 :             03 APINVC.DUE.DATE          CH(6),% NUM
0   0  00108000 :             03 APINVC.SAMOUNT           CH(1),
0   0  00109000 :             03 APINVC.AMOUNT            CH(9),% NUM
0   0  00110000 :             03 APINVC.SPAID             CH(1),
0   0  00111000 :             03 APINVC.PAID              CH(9),
0   0  00112000 :             03 APINVC.SPAYABLE          CH(1),
0   0  00113000 :             03 APINVC.PAYABLE           CH(9),
0   0  00114000 :             03 APINVC.DESC              CH(24),
0   0  00115000 :%
0   0  00116000 :          VENDOR.KEY                     FIXED,
0   0  00117000 :          INVOICE.KEY                    FIXED,
0   0  00118000 :          I                              BIT(8),
0   0  00119000 :%
0   0  00120000 :          01 STATION.TABLE (10),
0   0  00121000 :             03 THIS.VEND                FIXED,%
0   0  00122000 :             03 NEXT.VEND                FIXED,%
0   0  00123000 :             03 THIS.INV                 FIXED;
0   0  00124000 :&PAGE
```

UPL Compile Listing (2 of 6)

```
0   0   00125000 :PROCEDURE WRITE.REMOTE;                                                    :
1   0   00126000 :    % SEND OK MESSAGE BACK TO ODESY STATION                               :  WRITE.REMO
1   0   00127000 :    ODESY.MSG.TYPE := "11";                                               :  WRITE.REMO
1   0   00128000 :    WRITE STATIONS (ODESY.RECORD.AREA);                                   :  WRITE.REMO
1   0   00129000 :END WRITE.REMOTE;                                                        :  WRITE.REMO
0   0   00130000 :%                                                                        :
0   0   00131000 :PROCEDURE INVALID.FORMAT;                                               :
1   0   00132000 :    % SEND INVALID FORMAT MESSAGE BACK TO ODESY STATION. ODESY GROUP IS   :  INVALID.FO
1   0   00133000 :    % EQUAL TO "AP".                                                     :  INVALID.FO
1   0   00134000 :    ODESY.MSG.TYPE := "13";                                               :  INVALID.FO
1   0   00135000 :    WRITE STATIONS (ODESY.RECORD.AREA);                                   :  INVALID.FO
1   0   00136000 :END INVALID.FORMAT;                                                      :  INVALID.FO
0   0   00137000 :%                                                                        :
0   0   00138000 :%%%
```

```
0   0  00201000 :PROCEDURE MISSING.VENDOR;                                                    :
1   0  00202000 :    % SEND MISSING VENDOR MESSAGE TO ODESY TERMINAL BECAUSE THE             :  MISSING.VE
1   0  00203000 :    % VENDOR NUMBER WAS NOT FOUND IN THE VENDOR MASTER FILE.                :  MISSING.VE
1   0  00204000 :%                                                                          :  MISSING.VE
1   0  00205000 :    ODESY.DATA := SPACES;                                                  :  MISSING.VE
1   0  00206000 :    APNAME.VENDNO := CONVERT(THIS.VEND(BIN(ODESY.STATION)),CHARACTER,4);    :  MISSING.VE
1   0  00207000 :    APNAME.NAME := "MISSING VENDOR";                                       :  MISSING.VE
1   0  00208000 :    ODESY.LENGTH :="0100";                                                 :  MISSING.VE
1   0  00209000 :    WRITE.REMOTE;                                                          :  MISSING.VE
1   0  00210000 :END MISSING.VENDOR;                                                        :  MISSING.VE
0   0  00211000 :%                                                                          :
0   0  00212000 :PROCEDURE APNAME.FIRST.INVOICE;                                           :
1   0  00213000 :    NEXT.VEND(BIN(ODESY.STATION)) := THIS.VEND(BIN(ODESY.STATION));        :  APNAME.FIR
1   0  00214000 :    % CHANGE FORMAT NAME                                                   :  APNAME.FIR
1   0  00215000 :    ODESY.FORMAT := "INVC";                                                :  APNAME.FIR
1   0  00216000 :    THIS.INVC(BIN(ODESY.STATION)) := 0;           % CHECK ME              :  APNAME.FIR
1   0  00217000 :    APINVC.SUPPLY;                                                         :  APNAME.FIR
1   0  00218000 :END APNAME.FIRST.INVOICE;                                                  :  APNAME.FIR
0   0  00219000 :%                                                                          :
0   0  00220000 :PROCEDURE APNAME.CHECK;                                                   :
1   0  00221000 :    NEXT.VEND(BIN(ODESY.STATION)) := BIN(APNAME.NEXTVEND);                 :  APNAME.CHE
1   0  00222000 :    WRITE.REMOTE;                                                          :  APNAME.CHE
1   0  00223000 :END APNAME.CHECK;                                                          :  APNAME.CHE
0   0  00224000 :%                                                                          :
0   0  00225000 :PROCEDURE APNAME.SUPPLY;                                                  :
1   0  00226000 :    DO APNAME.LOOP;                                                        :  APNAME.SUP
1   1  00227000 :        IF NEXT.VEND(BIN(ODESY.STATION)) = 0 THEN                          :  APNAME.SUP
1   1  00228000 :            APNAME.FIRST.INVOICE;                                      :  APNAME.SUP
1   2  00229000 :        ELSE                                                           :  APNAME.SUP
1   1  00230000 :            DO SUPPLY.NEXT.VENDOR.DETAILS;                             :  APNAME.SUP
1   2  00231000 :               THIS.VEND(BIN(ODESY.STATION)) :=                        :  APNAME.SUP
1   2  00232000 :                                  NEXT.VEND(BIN(ODESY.STATION));       :  APNAME.SUP
1   2  00233000 :               VENDOR.KEY := THIS.VEND(BIN(ODESY.STATION));            :  APNAME.SUP
1   2  00234000 :               READ VENDMASTER [VENDOR.KEY] (VENDOR.REC.AREA);         :  APNAME.SUP
1   2  00235000 :                    ON EXCEPTION                                       :  APNAME.SUP
1   2  00236000 :                       DO;                                             :  APNAME.SUP
1   3  00237000 :                           DISPLAY "APNAME SUPPLY EXCEPTION ERROR";    :  APNAME.SUP
1   3  00238000 :                           MISSING.VENDOR;                             :  APNAME.SUP
1   3  00239000 :                           UNDO APNAME.LOOP;                           :  APNAME.SUP
1   3  00240000 :                       END;                                            :  APNAME.SUP
1   3  00241000 :                    ON EOF                                             :  APNAME.SUP
1   2  00242000 :                       DO;                                             :  APNAME.SUP
1   3  00243000 :                           DISPLAY "APNAME SUPPLY EOF ERROR";          :  APNAME.SUP
1   3  00244000 :                           MISSING.VENDOR;                             :  APNAME.SUP
1   3  00245000 :                           UNDO APNAME.LOOP;                           :  APNAME.SUP
1   3  00246000 :                       END;                                            :  APNAME.SUP
1   3  00247000 :               IF VEND.VENDNO = " " THEN UNDO APNAME.LOOP;% NO RECORD  :  APNAME.SUP
1   2  00248000 :               ODESY.DATA := SPACES;                                   :  APNAME.SUP
1   2  00249000 :               APNAME.VENDNO := VEND.VENDNO;                           :  APNAME.SUP
1   2  00250000 :               APNAME.NAME := VEND.NAME;                               :  APNAME.SUP
1   2  00251000 :               APNAME.ADDR := VEND.ADDR;                               :  APNAME.SUP
1   2  00252000 :               APNAME.ADDR2 := VEND.ADDR2;                             :  APNAME.SUP
1   2  00253000 :               APNAME.PAYBAL := VEND.PAYBAL;                           :  APNAME.SUP
1   2  00254000 :               IF BIN(VEND.PAYBAL) < 0 THEN                            :  APNAME.SUP
1   2  00255000 :                  APNAME.SPAYBAL := "-";                               :  APNAME.SUP
1   3  00256000 :               APNAME.DATE := VEND.DATE.LA;                            :  APNAME.SUP
1   2  00257000 :               ODESY.LENGTH := "0100";                                 :  APNAME.SUP
1   2  00258000 :               WRITE.REMOTE;                                           :  APNAME.SUP
1   2  00259000 :               UNDO APNAME.LOOP;                                       :  APNAME.SUP
1   2  00260000 :            END SUPPLY.NEXT.VENDOR.DETAILS;                            :  APNAME.SUP
1   2  00261000 :    END APNAME.LOOP;                                                   :  APNAME.SUP
1   0  00262000 :END APNAME.SUPPLY;                                                     :  APNAME.SUP
0   0  00263000 :$PAGE                                                                  :
```

UPL Compile Listing (4 of 6)

```
0   0  00264000 :PROCEDURE INVALID.KEY;                                                                    :
1   0  00265000 :    ODESY.MSG.TYPE := "12";                                                               :  INVALID.KE
1   0  00266000 :    WRITE STATIONS (ODESY.RECORD.AREA);                                                   :  INVALID.KE
1   0  00267000 :END INVALID.KEY;                                                                          :  INVALID.KE
0   0  00268000 :%                                                                                         :
0   0  00269000 :PROCEDURE APVEND.KEYDATA;                                                                 :
1   0  00270000 :    THIS.VEND(BIN(ODESY.STATION)) := BIN(APVEND.VENDNO);                                  :  APVEND.KEY
1   0  00271000 :    NEXT.VEND(BIN(ODESY.STATION)) := BIN(APVEND.VENDNO);                                  :  APVEND.KEY
1   0  00272000 :    THIS.INV(BIN(ODESY.STATION)) := 0;                                                    :  APVEND.KEY
1   0  00273000 :END APVEND.KEYDATA;                                                                      :  APVEND.KEY
0   0  00274000 :%                                                                                         :
0   0  00275000 :PROCEDURE AP.CHECK;                                                                       :
1   0  00276000 :    % DETERMINE WHAT TYPE OF PROCESSING NEEDS TO BE DONE                                  :  AP.CHECK
1   0  00277000 :    IF ODESY.FORMAT = "VEND" THEN                                                         :  AP.CHECK
1   0  00278000 :       APVEND.KEYDATA;                                                                    :  AP.CHECK
1   1  00279000 :    ELSE IF THIS.VEND(BIN(ODESY.STATION)) = 0 THEN                                        :  AP.CHECK
1   1  00280000 :       INVALID.KEY;                                                                       :  AP.CHECK
1   2  00281000 :    ELSE IF ODESY.FORMAT = "NAME" AND ODESY.MSG.TYPE = "02" THEN                          :  AP.CHECK
1   2  00282000 :       % SUPPLY DATA                                                                      :  AP.CHECK
1   2  00283000 :       APNAME.SUPPLY;                                                                     :  AP.CHECK
1   3  00284000 :    ELSE IF ODESY.FORMAT = "NAME" AND ODESY.MSG.TYPE = "03" THEN                          :  AP.CHECK
1   3  00285000 :       % CHECK DATA                                                                       :  AP.CHECK
1   3  00286000 :       APNAME.CHECK;                                                                      :  AP.CHECK
1   4  00287000 :    ELSE IF ODESY.FORMAT = "INVC" THEN                                                    :  AP.CHECK
1   4  00288000 :       APINVC.SUPPLY;                                                                     :  AP.CHECK
1   5  00289000 :    ELSE APVEND.KEYDATA;                                                                  :  AP.CHECK
1   5  00290000 :END AP.CHECK;                                                                             :  AP.CHECK
0   0  00291000 :&PAGE                                                                                     :
```

```
0   0  00292000 :%%%
```

```
COMPILE STATISTICS:

    NUMBER OF ERRORS DETECTED:     0
    NUMBER OF WARNINGS DETECTED:     0
    NUMBER OF CARDS SCANNED:       305
    NUMBER OF TOKENS SCANNED:     1204
    LL ZERO NAME STACK ENTRIES:     63

PROGRAM STATISTICS

    CORE REQUIRED TO RUN:          2786 BYTES      (  22288 BITS)
    NUMBER OF SEGMENTS:            2
    SIZE OF LARGEST SEGMENT:       1280 BYTES      (  10236 BITS)
    TOTAL SEGMENT SIZE:            1280 BYTES      (  10236 BITS)
    DISK SIZE:                    19 SEGMENTS

RUN STATISTICS:

    NAME STACK SIZE:                97 ENTRIES
    CONTROL STACK SIZE:            15 ENTRIES
    PROGRAM POINTER STACK SIZE:     25 ENTRIES
    EVALUATION STACK SIZE:         20 ENTRIES
    VALUE STACK SIZE:              1474 BITS
    PROGRAM STATIC CORE:             2756 BYTES      (  22048 BITS)
    PROGRAM DYNAMIC CORE:               0 BYTES      (      0 BITS)

COMPILE TIMES:

    ELAPSED TIME:   0:02:09.9
    PROCESSOR TIME:  26.1 SECONDS.
```

UPL Compile Listing (6 of 6)

SECTION 10. SYSTEM MAINTENANCE

In the course of system operation, it may be necessary to perform various maintenance and recovery functions specifically for ODESY. Procedures for control of the system and recovery of files comprise this section.

DATA CONTROL

Various data control procedures help to ensure the proper use of ODESY. The control of data may be centralized or decentralized, depending on your business.

It is the responsibility of data control to ensure that:

a. Data passes through ODESY once.

b. Batches are extracted when they are ready.

c. Batches are deleted when they are no longer required.

d. Batch numbers are allocated logically, for instance by assigning certain ranges of numbers to certain departments.

e. All checks have been performed before the batches are extracted.

f. Regular backup is taken of files.

SECURITY

System security is implemented at your discretion. A small data entry operation with minimal security requirements may operate without the restrictions of tight security, but a larger organization which needs to prevent unauthorized access to the sytem or files may use the full range of security features.

PASSWORDS

Each operator is assigned a number and password which must be entered during log-in to obtain access to ODESY data. You may impose a more rigorous system of access control through a supervisory MCS.

ACCESS LEVELS

Security levels allow you to restrict access to certain formats. Each operator is given a security level from Ø through 99 and each format is given a security level. If you do not require this feature, give all operators and formats identical security levels.

OPERATOR STATUS

A supervisor is an operator with higher status, specified by setting the supervisor status optioh when defining the operator to ODESY. You may enforce greater control by restricting certain commands to supervisors. These are the ACCEPT, CONTROL, DELETE, INSERT, MODIFY, SCHEDULE, TERMINATE, and ZIP commands, and the ALL form of the STATUS command.

CONTROL STATIONS

A control station is an ODESY station with control status. The use of control stations enables you to restrict the TERMINATE and ZIP commands to certain stations. Usually a supervisor operates a control station, which restricts the use of the TERMINATE and ZIP commands even further. These two commands are treated differently because they affect execution of the entire system, so extra security is provided to prevent their unauthorized use.

Create a permanent control station by setting the control status option when defining the station to ODESY. Create a temporary control station through the CONTROL command. The station retains control status only for the duration of the current session.

BACKUP

You should have a well-organized system for taking backup of the three ODESY master files on disk. Take backup on a regular basis, such as once or twice a day, depending on the volume of data being entered. Copy the files to magnetic tape or removable disk pack and use a cycle of at least three tapes or packs. It is imperative that you backup the System and Tank files at the same time when the files are not in use by an ODESY programs because the time and date in each file must match.

RECOVERY

ODESY provides comprehensive recovery and restart facilities to cope with hardware or software failure. These facilities are an integral part of the system and are automatically brought into use when the need arises. In the event of hardware or software failure, it is usually sufficient to re-execute ODESY. During normal startup, ODESY recognizes that the system has terminated

abnormally and invokes a recovery procedure to restore it to the state it was in prior to termination.

Recovery procedures are used by the Edit, Extraction, and Format Maintenance Programs. However, the recovery procedures assume that the three ODESY master files on disk have not been corrupted. If disk file corruption has occurred, ODESY should be able to provide a warning; it is unlikely that all of the ODESY record pointers and totals will match if the files are corrupted. If this should happen, load the most recent backup copy of the files.

EDIT PROGRAM

While the Edit Program is executing it maintains a record of the current action being processed, and a list of active stations, operators, and batches. Recovery either completes or removes the current action, closing all batches and logging out all operators. The files remain in usable condition and the maximum amount of data in each batch which may be lost is the record currently being processed or a maximum of one record per station.

After recovery operators must log in again, and at this point ODESY informs each operator of the batch number and record number being processed when the system failed, helping the operator to resume work at the point of interruption.

EXTRACTION PROGRAM

If the system fails while the Extraction Program is executing, operators may notice a batch permanently "in use at station 0." A batch is marked in use while the Extraction Program is extracting or deleting it to prevent an operator from accidentally opening the batch and making changes to it at the same time the Extraction Program is reading and updating the data records. Processing of the batch marked in use will be completed during the next execution of EXTRACT.

The Extraction Program first tries to complete the extraction or deletion of the batch processed previously. Execution continues by processing any other scheduled batches. The Extraction Report shows the batches processed.

The recovery procedure of the Extraction Program is independent of that of the Edit Program, so it is not necessary to restart both programs immediately if both were executing when the system failed.

FORMAT MAINTENANCE PROGRAM

The Format Maintenance Program does not have a complex recovery system because it is unnecessary. Files are updated only during a SAVE, LOAD, or REMOVE command and take only a small percentage of the total execution time. If the system terminates abnormally at any other time, files do not require recovery. In the event of hardware or software failure, restart the Format Maintenance Program and continue working. If a SAVE, LOAD, or REMOVE command is being processed when a failure occurs, ODESY provides a warning.

APPENDIX A. FORMAT MAINTENANCE PROGRAM COMMANDS

The Format Maintenance Program commands are used to manipulate the screen format options in ODESY, and this appendix explains how and when to use each command. Some control commands which allow you to manage system operation to a small degree are also included.

In this appendix, the commands are presented in diagrams composed of words and arrows. These diagrams show exactly what to enter to perform a task. To execute a command, trace any path along the direction of the arrows, and enter the words and symbols exactly as they appear along the path. Required words are shown in capital letters. Variables which you supply are shown within angle brackets (< >).

All ODESY commands must be preceded by a slash (/); however, it is necessary to enter only the first three letters of the command for ODESY to recognize it.

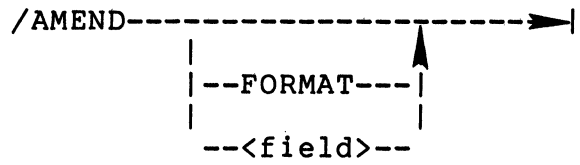
To create, list, delete, and modify screen formats, enter the appropriate commands after the program has been requested. To enter a command:

a. Type <command>
b. Press the transmit key (XMT)

A summary of valid commands for the Format Maintenance Program and an explanation of each command follows. When a command has more than one form, each option is explained.

AMEND

The AMEND command is used to make changes to format data in the workarea.



Use this command to update an existing group header, format header, or field. Obtain the group header or format header from the Formats file before using the AMEND command.

The AMEND command has three options:

1. /AMEND

   This option changes a group header.

2. /AMEND FORMAT

   This option changes a format header.

3. /AMEND <field>

   To change a field, specify the new field sequence number. This option initiates a cycle in which data for the next field is automatically displayed following the data for the current field. The next ODESY command entered stops this cycle.

BYE

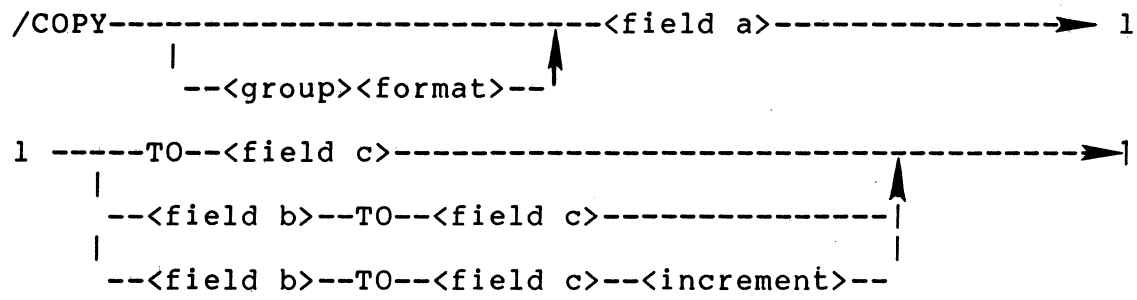
The BYE command ends the Format Maintenance Program and logs the operator out of the system.

Use this command to end a format maintenance session.

Unsaved format data in the workarea must be saved or deleted before using the BYE command. The data can be deleted, or transferred to the Formats file using the SAVE command or to a Formats Dump file using the DUMP command.

COPY

The COPY command duplicates a field, or range of fields, from a format in the Formats file or from the current format in the workarea and places the new field in the workarea.



Use this command to copy a single field or group of fields from another part of the workarea or from another format. A group of fields with the same set of format options often appears several times in a format. The COPY command allows unlimited duplication of fields.

In copying fields from another format, the format specified must be in the Formats file.

The COPY command has six options:

1. /COPY <field a> TO <field c>

   This option copies a single field specified as field a to the destination indicated by field c.

2. /COPY <field a> <field b> TO <field c>

   This option copies a range of fields specified as field a through field b to the destination indicated by field c and continuing by default increments of 10.

3. /COPY <field a> <field b> TO <field c> <increment>

   This option copies a range of fields specified as field a through field b to the destination beginning at the point indicated by field c and continuing through the sequence number determined by the increment. The second field will be numbered as field c plus increment, the third field as field c plus two times the increment, ans so on. The default increment is 10.

4. /COPY <group> <format> <field a> TO <field c>

   This option copies a single field from the format specified as field a to the destination indicated by field c.

5. /COPY <group> <format> <field a> <field b> TO <field c>

   This option copies a range of fields from the format specified as field a through field b to the destination indicated by field c and continuing by default increments of 10.

6. /COPY <group> <format> <field a> <field b> TO <field c> <increment>

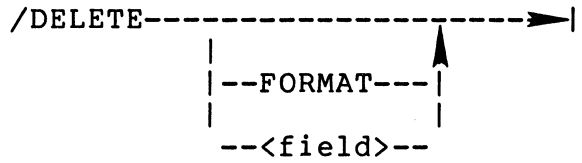
   This option copies a range of fields from the format specified as field a through field b to the destination beginning at the point indicated by field c and continuing through the sequence number determined by the increment. The second field will be numbered as field c plus increment, the third field as field c plus two times the increment, and so on. The default increment is 10.

If copying a range of fields would result in duplicate sequence numbers or a number greater than 999, the copy is not performed and message 152 SEQUENCE NUMBERS WILL NOT FIT is displayed.

The COPY command is distinguished from the MOVE command as follows: if field 10 is copied to field 55, two identical fields, 10 and 55, will exist after the copy. If field 10 is moved to field 55, only field 55 will exist after the move.

DELETE

The DELETE command deletes format data from the workarea.



Use this command to delete all or part of the data in the workarea. Individual fields or the whole format, with or without the group header, can be deleted from the workarea.

If you attempt to use, for instance, the BYE or INSERT commands with unsaved data in the workarea, message 134 SAVE OR DELETE is displayed as a warning.

Note that the REMOVE command removes format data from the Formats file.

The DELETE command has three options:

1. /DELETE

   This option deletes the entire workarea and is often used when there is data in the workarea which has been changed but is not to be saved.

2. /DELETE FORMAT

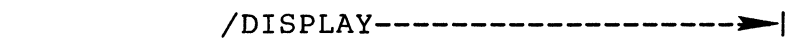
   With this option all format data other than the group header is deleted from the workarea.

3. /DELETE <field>

   This option deletes a single field from the workarea.

DISPLAY

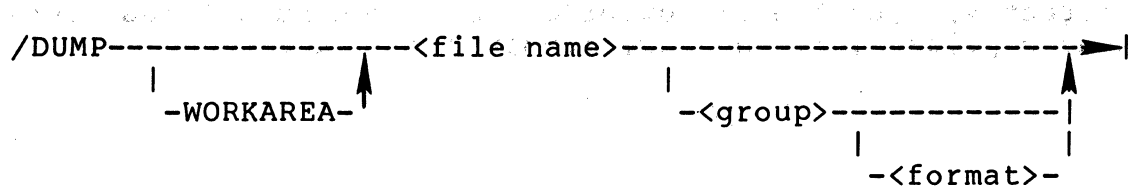
The DISPLAY command is used to view the screen layout of a format residing in the workarea.



Use this command to check the alignment of fields and field descriptions, but make changes through the AMEND command. The format must be in the workarea before using the DISPLAY command.

DUMP

The DUMP command moves format data from the Formats file or workarea to a Format Dump file.



Use this command to transfer formats to a secondary file known as a Formats Dump file.

Old or seldom used format versions can be stored in the Dump file. It also can be used to transfer format data between different copies of the Formats file or between small and medium systems ODESY, or as temporary storage when format maintenance takes place at the same time as data entry (refer to the SAVE command).

If a Dump file with the file name specified already exists, formats are added to the existing file; otherwise a new Dump file is created.

The DUMP command has five options:

1. /DUMP <file name>

   This option transfers the contents of the Formats file to a specified Dump file.

2. /DUMP <file name> <group>

   This option transfers a group of formats in the Formats file to a specified Dump file.

3. /DUMP <file name> <group> <format>

   This option transfers a single format in the Formats file to a specified Dump file.

4. /DUMP WORKAREA <file name>

   This option transfers the contents of the workarea to a specified Dump file.

5. /DUMP WORKAREA <file name> <group>

This option transfers the group header data in the workarea to a specified Dump file.

It is possible to have two or more formats with the same name in a Dump file when formats are repeatedly dumped to an existing file because a Dump file is a serial file and new data is added to the end of the file. Dump files with duplicates load correctly, but the disadvantage of large Dump files containing many duplicates is the time required to load.

SPSC - DMQS
SBS - DmQS

CCC1 - HRL
CCC2 - PIC
CCC3 - JOB

PIN1 - HRL
PIN2 - PIC
PIN3 - JOB

TRC1 - HRL
TRC2 - PIC
TRC3 - JOB

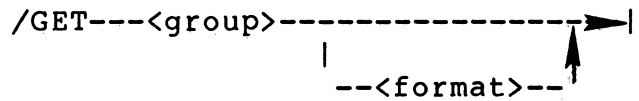
ESBS - DMQS
PSBS - DMQS

TABL - RECL

SBSU - REC B
REC D

GET

The GET command transfers format data from the Formats file to the workarea where it can be manipulated by workarea commands.



Use this command to obtain a group header and format from the Formats file.

The GET and SAVE commands are jointly responsible for the transfer of data between the workarea (temporary storage) and the Formats file (permanent storage). Unsaved format data in the workarea must be saved or deleted before proceeding.

The GET command has two options:

1. /GET <group>

   This option transfers the group header from the Formats file to the workarea.

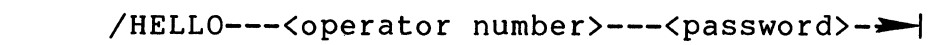
2. /GET <group> <format>

   This option transfers the group header, format header, and all fields from the Formats file to the workarea.

Message 134 SAVE OR DELETE is displayed as a warning that there is unsaved format data in the workarea and the data must be saved or deleted before proceeding.

HELLO

The HELLO command logs an operator into the system for format maintenance.



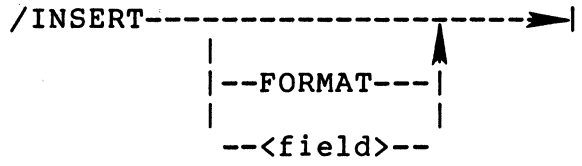
Use this command to begin a format maintenance session.

The operator number and password must refer to a valid operator defined in the System file.

Only one operator is permitted to maintain formats at a time; if an operator at another station is already logged in, message 150 OPERATOR LOGGED IN ELSEWHERE is displayed and access is denied.

INSERT

The INSERT command inserts new format data into the workarea.



Use this command to begin insertion of a new group, new format, or new field into the workarea.

The workarea can hold only one format and one group header at a time. Unsaved data in the workarea must be either deleted or transferred to the Formats file through the SAVE command or to a Formats Dump file through the DUMP command before using the INSERT command.

The INSERT command has three options:

1. /INSERT

   This option inserts a new group header followed by a format header and fields.

2. /INSERT FORMAT

   This option inserts a new format header followed by the fields of the format. The group header must be in the workarea; if a new format is being added to an existing group, obtain the group header through the GET command.

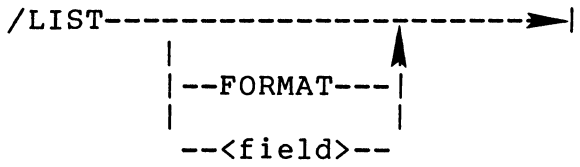
3. /INSERT <field>

   To insert a new field into the format in the workarea, specify the field sequence number. If a new field is to be inserted into an existing format in the Formats file, use the GET command to transfer the format to the workarea.

The INSERT command initiates a cycle in which the group header formats are automatically followed by the format header format and then by the field formats. The cycle repeats automatically for the insertion of more fields. Stop this cycle by entering an ODESY command.

LIST

The LIST command lists the format data contained in the workarea so that individual format options may be viewed.



Use this command to list on the screen the format options of an existing group header, format header, or field. Obtain the group header or format from the Formats file before using the LIST command.

The LIST command has three options:

1. /LIST

   This option lists a group header.

2. /LIST FORMAT

   This option lists a format header.

3. /LIST <field>

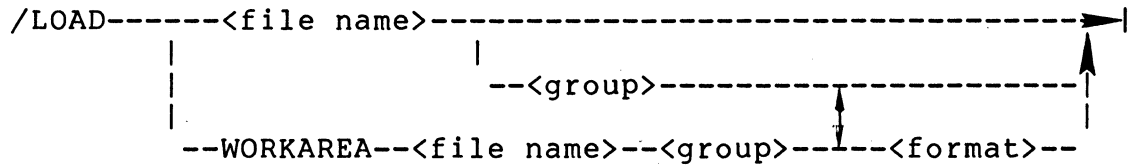
   To list a field, specify the field sequence number.

This command initiates a cycle in which the group header formats are automatically followed by the format header format and then by the field formats. The cycle repeats automatically for the listing of other fields.

To request the next page in the cycle transmit a single blank character. Stop this cycle by using an ODESY command.

LOAD

The LOAD command transfers format data from a Format Dump file to the Formats file or workarea.



Formats cannot be loaded while data entry or extraction is in progress; if the Formats file is in use by another ODESY program, message 153 FORMATS FILE IS IN USE is displayed.

The LOAD command has five options:

1. /LOAD <file name>

   This option transfers the entire Dump file to the Formats file.

2. /LOAD <file name> <group>

   This option transfers a group from the Format Dump file to the Formats file.

3. /LOAD <file name> <group> <format>

   To transfer a single format from a Format Dump file to the Formats file, specify the group name and format name.

4. /LOAD WORKAREA <file name> <group>

   This option transfers the group header data to the workarea.

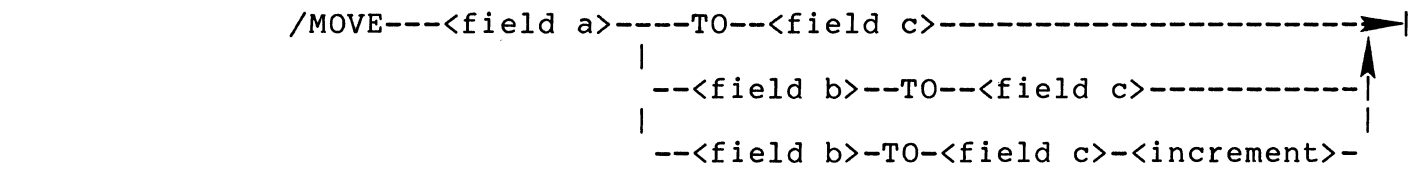
5. /LOAD WORKAREA <file name> <group> <format>

   This option transfers the specified format to the workarea.

Message 144 NO FORMATS HAVE BEEN LOADED is displayed as a warning if no format is loaded.

MOVE

The MOVE command changes the order of fields within the workarea.



Use this command to move a single field or group of fields from one part of the workarea to another part. Field sequence numbers determine the order in which fields appear on the screen, so moving a field alters its position on the screen.

The MOVE command has three options:

1. /MOVE <field a> TO <field c>

   This option moves a single field specified as field a to the destination indicated by field c.

2. /MOVE <field a> <field b> TO <field c>

   This option moves a range of fields specified as field a through field b to the destination indicated by field c and continuing by default increments of 1Ø.

3. /MOVE <field a> <field b> TO <field c> <increment>

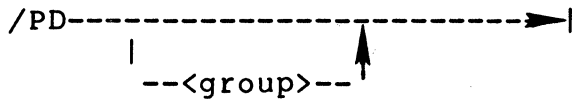
   This option moves a range of fields specified as field a through field b to the destination beginning at the point indicated by field c and continuing through the sequence number determined by the increment. The second field will be numbered as field c plus increment, the third field as field c plus two times the increment, and so on. The default increment is 1Ø.

If moving a range of fields would result in duplicate sequence numbers or a number greater than 999, the move is not performed and message 152 SEQUENCE NUMBERS WILL NOT FIT is displayed.

The MOVE command is distinguished from the COPY command as follows: if field 1Ø is moved to field 55, only one field, 55, will exist after the move. If field 1Ø is copied to field 55, two fields, 1Ø and 55, will exist after the copy.

PRINT DIRECTORY (PD)

The PRINT DIRECTORY command produces a directory listing of all group names in the Formats file or of all format names in a specific group.



The PRINT DIRECTORY command has two options:

1. /PD

   This option produces a listing of all group names in the Formats file.

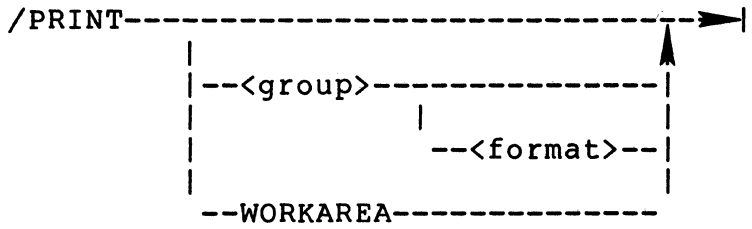
2. /PD <group>

   This option produces a listing of all format names in the group specified.

If the list of names does not fit on one screen, a field appears in the lower right corner of the screen. Transmit the cursor from this field to obtain continuation pages.

PRINT

The PRINT command produces a formatted line printer report of the data in the Formats file or workarea including a representation of the screen layout of the format.



Use this command to request a printed report of ODESY formats. Reports must be requested through this command; they are not automatically produced as data is inserted.

The PRINT command has four options:

1. /PRINT

   This option produces a report for each format in the Formats file.

2. /PRINT <group>

   This option produces a report for each format in the specified group.

3. /PRINT <group> <format>

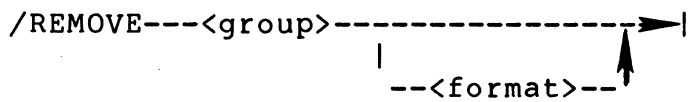
   This option produces a report showing a single format.

4. /PRINT WORKAREA

   This option produces a report showing the contents of the workarea.

REMOVE

The REMOVE command removes a specific format or group of formats from the Formats file.



The REMOVE command has two options:

1. /REMOVE <group>

   This option removes the group header and all of its formats from the Formats file.

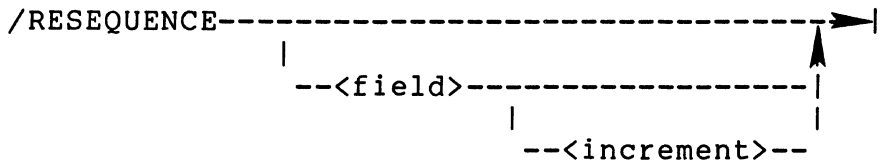
2. /REMOVE <group> <format>

   This option removes a single format from the Formats file.

Formats cannot be removed while data entry or extraction is in progress. If the Formats file is in use by another ODESY program, message 153 FORMATS FILE IS IN USE is displayed.

RESEQUENCE

The RESEQUENCE command allocates new field sequence numbers to the fields in the workarea.



The first field in the workarea is renumbered as base field sequence number. The second field will be numbered as base field sequence number plus increment, the third field as base field sequence number plus two times the increment, and so on.

The RESEQUENCE command has three options:

1. /RESEQUENCE

   This option resequences the fields in the format workarea using 1Ø as a default base field sequence number and 1Ø as a default increment.

2. /RESEQUENCE <field>

   This option resequences the fields in the format workarea using the specified base field sequence number and 1Ø as a default increment.

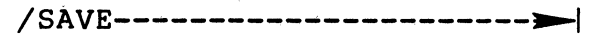
3. /RESEQUENCE <field> <increment>

   This option resequences the fields in the format workarea using the base field sequence number specified and the increment specified.

If resequencing the fields would result in a number greater than 999, message 152 SEQUENCE NUMBERS WILL NOT FIT is displayed. Repeat the command with a smaller increment.

SAVE

The SAVE command transfers the contents of the workarea to the Formats file.



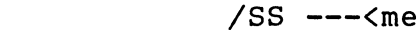
Use this command to update the Formats file after inserting a new format or making changes to an existing format.

The contents of the workarea remain intact after using the SAVE command, so further changes may be made to the format without using the GET command again. Once the workarea has been saved, you may retrieve other formats from the Formats file without saving or deleting the workarea.

If the Formats file is in use by another ODESY program, message 153 FORMATS FILE IS IN USE is displayed. Formats cannot be saved while data entry or extraction is in progress, but they can be temporarily dumped and then loaded to the Formats file at a later time. Refer to the DUMP and LOAD commands.

SEND TO SPO (SS)

The SEND TO SPO command sends a message to the ODT.



The message text is truncated if it exceeds 60 characters. Note that a blank character is required between the command and the message text.

This command is helpful when stations are located at some distance from the ODT.

APPENDIX B. SYSTEM PARAMETERS AND FORMAT MAINTENANCE INPUT FORMATS

The first part of this appendix contains the formats used for input through the File Maintenance Program. The second part of this appendix contains the formats used for input through the Format Maintenance Program. The input formats shown here are intended to represent the screen layouts, which actually appear in the upper left corner of the entire screen.

All input is mandatory unless otherwise noted; you must include a value for every parameter! Default values for many options are included with the release, and are shown here within forms delimiters for each option and are stated in the explanatory text following each screen. A blank field signifies that there is no default value and you must enter a value for that parameter.

FILEMAINT INPUT FORMATS

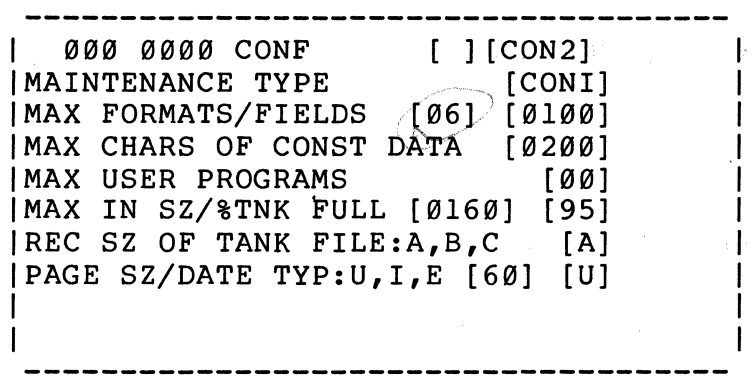
The input formats included here are used to enter system parameters through the File Maintenance Program. Consult Section 4 for more information.

SYSTEM CONFIGURATION PARAMETERS

System configuration parameters consist of parameters for the Edit, Format Maintenance, and Extraction Programs, and for several options.

EDIT Configuration Parameters

Use this format to specify parameters for the Edit Program and several general purpose parameters. Some of these parameters control the sizes of certain tables held in memory by the Edit Program and therefore affect memory requirements. Keeping the sizes of these tables small increases format overlays, which may affect response time. You may prefer to increase the default values.


000 0000 CONF [ ][CON2]
MAINTENANCE TYPE [CONI]
MAX FORMATS/FIELDS [06] [0100]
MAX CHARS OF CONST DATA [0200]
MAX USER PROGRAMS [00]
MAX IN SZ/%TNK FULL [0160] [95]
REC SZ OF TANK FILE:A,B,C [A]
PAGE SZ/DATE TYP:U,I,E [60] [U]

Maintenance Type

This option determines the type of file maintenance. With the default value CONI, the System file is updated to include the configuration data entered. With the optional value INIT, the Formats, System and Tank files are created and initialized using the configuration parameters entered.

Maximum Formats/Fields

The first value determines the size of the format table for the Edit Program. Enter a 2-digit number from 1 through 63. The default is 6.

The second value determines the size of the field table for the Edit Program. Enter a 4-digit number from 1 through 2047. The default is 100.

Maximum Characters of Constant Data

This is the size of the constant table for the Edit Program. It holds inserted constants, range check constants, and value check constants. Enter a 4-digit number from 100 through 4095. The default is 200.

Maximum User Programs

This 2-digit number determines the size of the user program table for the Edit Program. Enter a number from 0 through 31. The default is 0.

Maximum Input Size/Percentage for Tank File Warning

The first value is the maximum input data size for any format used by the Edit Program. It also affects the Tank file record size. Enter a 4-digit number from 1 through 1023. The default is 160.

A warning is given by the Edit Program when the Tank file is some specified percent full and this parameter specifies that percentage. Enter a 2-digit number from 25 through 99. The default is 95.

Tank File Record Size

This parameter specifies the record size of the Tank file. Three values are possible. Choose the smallest that is consistent with maximum input size. Enter A for 180 bytes, B for 540 bytes, and C for 1080 bytes. The default is A.

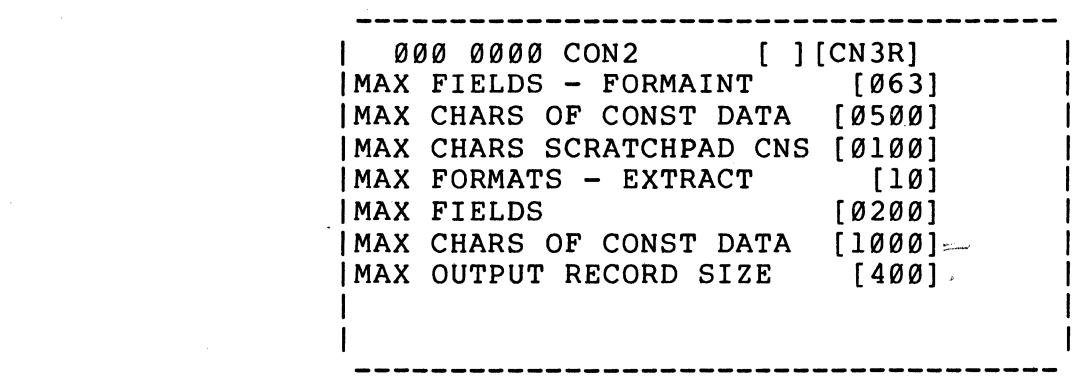
Page Size/Date Type

The first value is the page size for all reports printed by all programs. Enter a 2-digit number from 10 through 99. The default is 60 lines per page.

The second value is the format of the date printed in all reports by all programs. It is also the system default date type for checks on date fields. Enter U for USA format (MMDDYY), E for European format (DDMMYY), or I for International format (YYMMDD). The default is U.

FORMAINT and EXTRACT Configuration Parameters

This format consists of parameters for the Format Maintenance and Extraction Programs. These parameters control the sizes of certain tables held in memory by the programs and therefore affect memory requirements. You may prefer to increase the default values.


000 0000 CON2 [ ][CN3R]
MAX FIELDS - FORMAINT [063]
MAX CHARS OF CONST DATA [0500]
MAX CHARS SCRATCHPAD CNS [0100]
MAX FORMATS - EXTRACT [10]
MAX FIELDS [0200]
MAX CHARS OF CONST DATA [1000]
MAX OUTPUT RECORD SIZE [400]

Maximum Fields

This 3-digit value determines the size of the field table for the Format Maintenance Program. Since FORMAINT is used to insert format data, this value is also the maximum number of fields in any format. Enter a number from 63 through 255. The default is 63.

Maximum Characters of Constant Data

This 4-digit number is the size of the constant table for the Format Maintenance Program. It holds inserted constants, range check constants, and value check constants. Since FORMAINT is used to insert format data, this value is also the maximum number of characters of constant data in any format. Enter a number from 100 through 4095. The default is 500.

Maximum Characters of Scratchpad Constant Data

This is the size of the scratchpad constant table for the Format Maintenance Program. Since FORMAINT is used to insert format data, this value is also the maximum number of characters of constant data in any field of any format. Enter a 4-digit number from 25 through 1023. The default is 100.

Maximum Formats

This 2-digit number determines the size of the format table for the Extraction Program. Enter a number from 1 through 31. The default is 10.

Maximum Fields

This value is the size of the field table for the Extraction Program. Enter a 4-digit number from 1 through 1023. The default is 200.

Maximum Characters of Constant Data

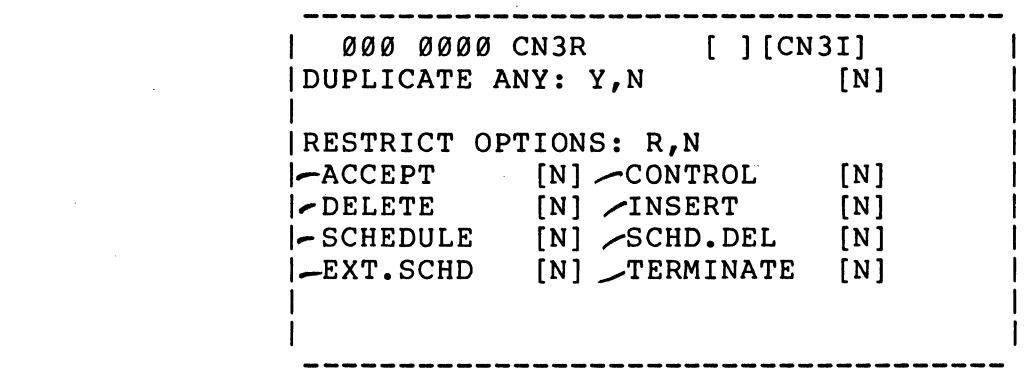
This 4-digit number is the size of the constant table for the Extraction Program. It is used for field names and inserted constants. Enter a number from 250 through 2000. The default is 1000.

Maximum Output Record Size

This is the maximum block size (record size times blocking factor) for an application file produced by the Extraction Program. Enter a 3-digit number from 80 through 999. The default is 400.

Duplicate and Restrict Configuration Parameters

These parameters allow data to be duplicated from any format and enable certain commands to be restricted to supervisors.


000 0000 CN3R [ ][CN3I]
DUPLICATE ANY: Y,N [N]
RESTRICT OPTIONS: R,N
ACCEPT [N] CONTROL [N]
DELETE [N] INSCRT [N]
SCHEDULE [N] SCHD.DEL [N]
EXT.SCHD [N] TERMINATE [N]

Duplicate Any

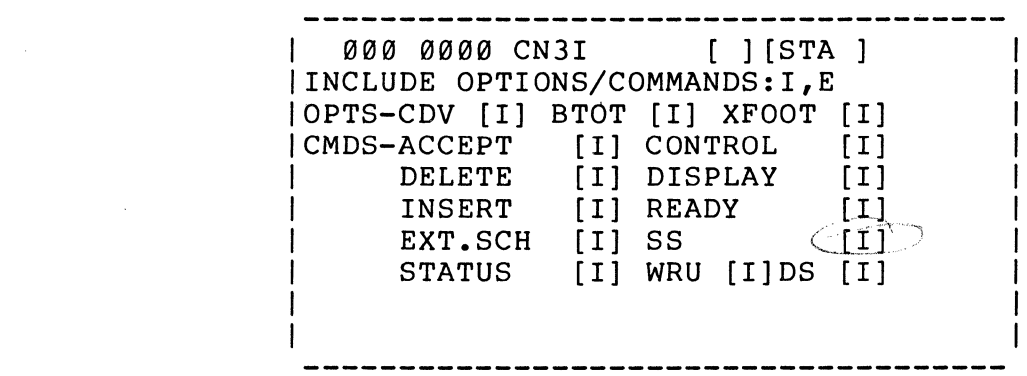
This option allows data to be duplicated from the previous format regardless of whether the format name has changed. Enter Y (yes) for this feature or N (no) for the default option, which duplicates data from the previous format only if the format name is the same.

Restrict Options

The restrict options allow the Edit Program commands indicated to be restricted to operators with supervisory status. If the schedule option is not restricted, but the schedule delete option is restricted, only the delete options of the SCHEDULE command are restricted. Enter R for restricted or N for nonrestricted. The default is N.

Include Configuration Parameters

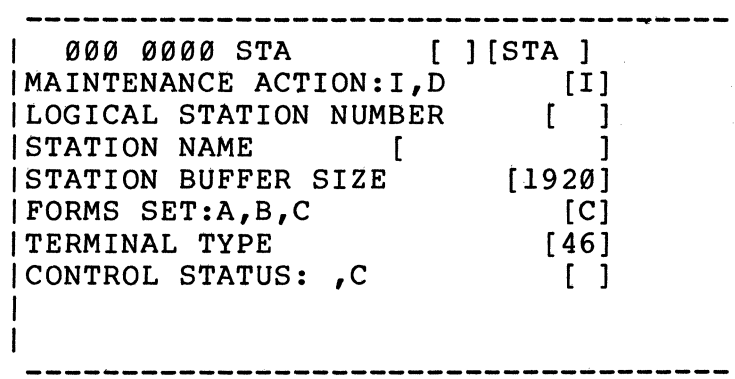
The include options allow those features and EDIT commands indicated to be excluded from use.


000 0000 CN3I [ ][STA]
INCLUDE OPTIONS/COMMANDS:I,E
OPTS-CDV [I] BTOT [I] XFOOT [I]
CMDS-ACCEPT [I] CONTROL [I]
DELETE [I] DISPLAY [I]
INSERT [I] READY [I]
EXT.SCH [I] SS [I]
STATUS [I] WRU [I]DS [I]

If the check digit verification, batch total, or crossfoot options are excluded, the respective checks are not performed by the Edit Program. If the ACCEPT, CONTROL, or SS commands are excluded, they are not recognized by the Edit Program. Enter E for excluded or I for included. The default is I.

STATION PARAMETERS

Station parameters are required for each ODESY station in the network.


000 0000 STA [ ][STA]
MAINTENANCE ACTION:I,D [I]
LOGICAL STATION NUMBER [ ]
STATION NAME [ ]
STATION BUFFER SIZE [1920]
FORMS SET:A,B,C [C]
TERMINAL TYPE [46]
CONTROL STATUS: ,C [ ]

Maintenance Action

Use this option to specify whether the station is to be inserted or amended, or deleted. Enter I for insert or amend, D for delete. The default is I.

Logical Station Number

Obtain the station number from the NDL listing. Enter a 2-digit number from 1 through 99.

Station Name

Station name is optional. It may be obtained from the NDL listing. Enter a maximum of 10 characters.

Station Buffer Size

Station buffer size is used by ODESY for data communications purposes. Obtain this value from the terminal section of the NDL listing. Enter a 4-digit number from 10 through 4095. The default is 1920.

Forms Set

This option determines the type of forms delimiters used for the station. Enter A for braces ({ }), B for brackets ([ ]), or C for US and RS. The default is C. (NOTE: ODESY uses US and RS as forms delimiters on the TD 730, TD 820, and TD 830.)

What are US & RS

Terminal Type

ODESY uses terminal type for data communications purposes. Obtain this value from the station section of the NDL listing.

Enter a 2-digit number from 32 through 46. The default is 46. Defined terminal types are:

```
32 = TD 700
33 = TD 730A
34 = TD 730B
41 = TD 801
42 = TD 802
43 = TD 821
44 = TD 822
45 = TD 831
46 = TD 832
```

Control Status

When this option is set the station is a permanent control station, and may use the CONTROL, TERMINATE, and ZIP commands during data entry. Enter C for control status; otherwise leave blank.

OPERATOR PARAMETERS

Operator parameters are required for each ODESY operator.

```
 ------------------------------------
|  000 0000 OPR       [ ][OPR ]      |
|MAINTENANCE ACTION:I,D      [I]     |
|OPERATOR NUMBER           [  ]      |
|OPERATOR NAM [              ]       |
|OPERATOR PASSWORD        [    ]     |
|OPERATOR SECURITY LEVEL   [50]      |
|OPERATOR TYPE:O,S          [0]      |
|                                    |
|                                    |
 ------------------------------------
```

Maintenance Action

This option determines whether a particular operator is to be inserted or amended, or deleted. Enter I for insert or amend, D for delete. The default is I.

Operator Number

A number is used to identify the operator. Enter a 2-digit number from 1 through 99.

Operator Name

This name is used for documentation purposes only. Enter a maximum of 16 characters for an operator name.

Operator Password

A password is used when logging in for data entry or format maintenance. Enter a maximum of four characters for a password.

Operator Security Level

The level must be equal to or greater than the security level of any format which the operator is to use. Enter a 2-digit number from 1 through 99. The default is 50.

Operator Type

This value indicates whether the operator has supervisory status. Enter S for a supervisor, 0 for an operator. The default is 0.

MESSAGE TEXT PARAMETERS

The default message texts used in the system messages for the Format Maintenance Program are shown in Appendix D. Use this format to change those default message texts.

```
 ------------------------------------------
|  000 0000 TEXT      [ ][TEXT]            |
|TEXT NUMBER [   ]                         |
|TEXT [                              ]     |
|TEXT NUMBER [   ]                         |
|TEXT [                              ]     |
|                                          |
|                                          |
 ------------------------------------------
```

Text Number

This is the number used in Appendix D to identify this system message. Enter a 3-digit number from 1 through 199.

Text

Most system messages have a maximum length of 31 characters, but several have fewer characters; refer to Appendix D.

COMMAND PARAMETERS

Only the first three characters of the commands and keywords used for data entry and format maintenance are significant. Default 3-character abbreviations may be changed using these formats.

EDIT Command Parameters

Enter a maximum of three characters to identify each command or keyword.

```
 ------------------------------------
|  000 0000 CMD       [ ][CMD2]      |
|CLOSE   [CLO] ACCEPT      [ACC]     |
|DELETE  [DEL] INSERT      [INS]     |
|OPEN    [OPE] SCHEDULE    [SCH]     |
|BYE     [BYE] HELLO       [HEL]     |
|STATUS  [STA] SS          [SS ]     |
|WRU     [WRU] TERMINATE   [TER]     |
|CONTROL [CON] READY       [REA]     |
|                                     |
|                                     |
 ------------------------------------
```

The DELETE abbreviation is also used as a keyword in the SCHEDULE command.

```
 ------------------------------------
|  000 0000 CMD2      [ ][CMD3]      |
|ENTER    [ENT] VERIFY     [VER]     |
|OVERRIDE [OVE] ON         [ON]      |
|OFF      [OFF] NOW        [NOW]     |
|ZIP      [ZIP] ALL        [ALL]     |
|DISPLAY  [DIS] MODIFY     [MOD]     |
|TOTALS   [TOT] INQUIRY    [INQ]     |
|DS       [DS ]                      |
|                                     |
|                                     |
 ------------------------------------
```

The keywords ENTER, VERIFY, and INQUIRY are used with the OPEN command; otherwise these abbreviations appear only in the control line and in status reports to identify the current mode and action.

FORMAINT Command Parameters

Enter a maximum of three characters to identify each command or keyword.

```
 ------------------------------------
|  000 0000 CMD3      [ ][CMD4]      |
|INSERT   [INS] LIST       [LIS]     |
|AMEND    [AME] COPY       [COP]     |
|MOVE     [MOV] RESEQUENCE [RES]     |
|DELETE   [DEL] DISPLAY    [DIS]     |
|SAVE     [SAV] GET        [GET]     |
|REMOVE   [REM] PD         [PD]      |
|PRINT    [PRI] HELLO      [HEL]     |
|                                    |
|                                    |
 ------------------------------------

 ------------------------------------
|  000 0000 CMD4      [ ][    ]      |
|BYE      [BYE] DUMP       [DUM]     |
|LOAD     [LOA] SS         [SS ]     |
|                                    |
|KEYWORDS - GROUP     [GRO]          |
|           FORMAT    [FOR]          |
|           FIELD     [FIE]          |
|                                    |
|                                    |
 ------------------------------------
```

The keywords GROUP and FORMAT are used with the AMEND, DELETE, INSERT, and LIST commands, and GROUP, FORMAT, and FIELD appear in the control line to identify the current action.

CHECK DIGIT PARAMETERS

You may define a maximum of nine check digit verification schemes. Check digit parameters are required for each check digit verification scheme. Three check digit verification schemes are defined in the standard system configuration as schemes 1, 2, and 3, respectively: Burroughs Modulus 10, IBM Modulus 11, and Burroughs Modulus 11. They may be replaced or amended. Refer to Section 4 and Appendix C for a more detailed explanation of check digit verification.

```
 ------------------------------------
|  000 0000 CDV       [ ][CDV ]      |
|                                    |
|MAINTENANCE ACTION:I,D       [I]    |
|SCHEME NUMBER [ ] MODULUS    [  ]   |
|REMAINDER                    [  ]   |
|CALC TYPE:A,E,M               [E]   |
|COMPLEMENT [ ]NBR. WEIGHTS   [  ]   |
|WEIGHTS              [          ]   |
|                                    |
|                                    |
 ------------------------------------
```

Maintenance Action

This value determines whether the check digit verification scheme is to be inserted or amended, or deleted. Enter I for insert or amend, D for delete. The default is I.

Scheme Number

This number identifies this check digit verification scheme. Enter a number from 1 through 9.

Modulus and Remainder

The modulus and remainder are used in the calculation of the check digit. For modulus, enter the 2-digit number identifying the scheme number by name. For remainder, enter a 2-digit number from 10 through 15.

Calculation Type

Enter M if the weights are supplied, A if the weights are supplied and all digits are to be added, or E if the products are supplied. The default is E.

Complemented

Complemented determines whether the final product is to be subtracted from the modulus in calculating the check digit. Enter Y if the check digit is to be complemented; otherwise enter N.

Number of Weights

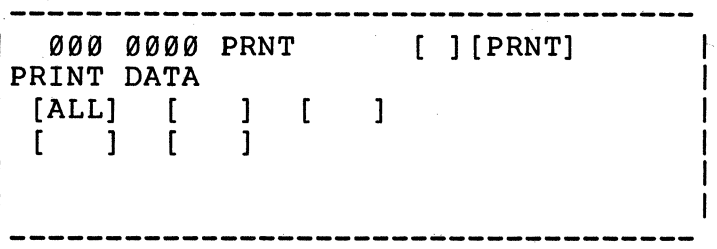
This is the number of weights used in the check digit calculation. Enter a 2-digit number from 1 through 10 for the number of weights.

Weights

For calculation types M and A, enter the weights as left-justified 2-digit numbers; otherwise, enter the products as a group of 10 2-digit products for each weight.

PRINT PARAMETERS

Use this format to request printing of all or part of the parameters in the System file.



The first print request is mandatory, but the other four requests are optional.

Enter a valid request type. The default is ALL. Defined print requests are:

ALL = all request types

CDV = check digit data

CMD = commands data

CON = configuration data

CTL = control record data from the master files

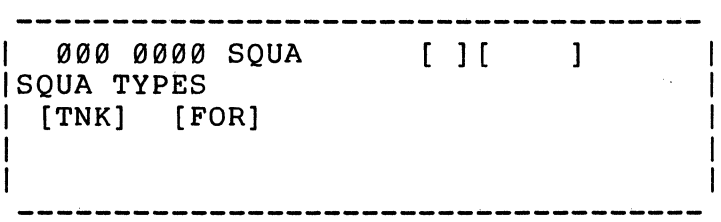
OPR = operator data

STA = station data

TXT = system message data

SQUASH PARAMETERS

Use this format to request squashing of the Tank file and/or the Formats file.



The first squash request is mandatory, but the second request is optional.

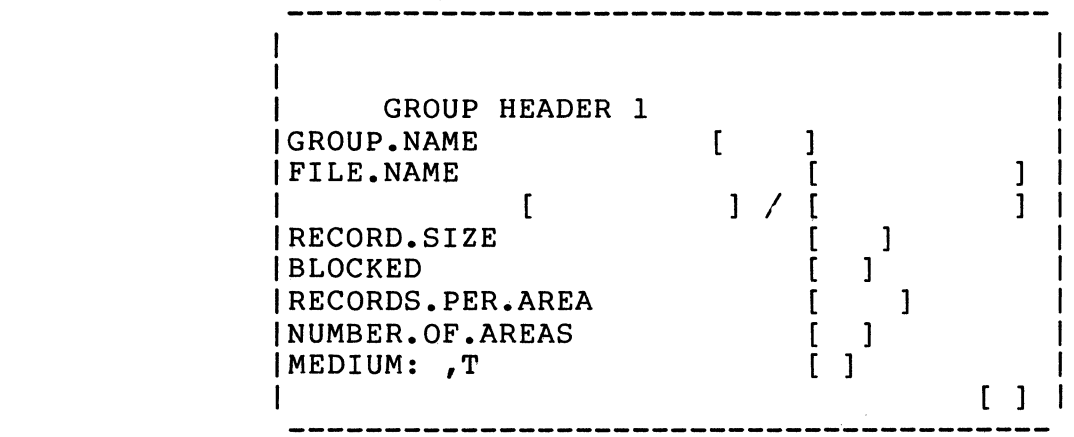
Enter TNK to squash the Tank file or FOR to squash the Formats file. Both values appear as the default.

FORMAINT INPUT FORMATS

The input formats included here are used to create and modify screen formats through the Format Maintenance Program. Consult Section 6 for more information.

GROUP HEADER DATA

Group header data specifies the physical characteristics of the application file and several general options for the group. It links the application file with the formats in the group.



Group Name

This name identifies the group. Enter a maximum of four alphanumeric (A-Z or Ø-9) characters.

File Name

This is the name of the application file produced by ODESY when a batch is created and scheduled using this group. A three-part name is allowed, consisting of pack-identification, family-identification, and file-identification. The file-ID is mandatory only if a usercode is specified in the family name; otherwise only the family name is mandatory. For disk files, the pack-ID is optional. For tape files, the pack-ID must be left blank.

Record Size

This value indicates the record size of the application file. Enter a number from 1 through 999. The default is 18Ø.

Blocked

This value is the blocking factor of the application file. Enter a number from 1 through 99. The default is 1.

Records per Area

This number is the area size of the application file, but is required only for disk files. Enter a number from 1 through 9999. The default is 500.

Number of Areas

This value is the maximum number of areas allowed for the application file, but is required only for disk files. Enter a number from 1 through 99. The default is 40.

Medium

This option specifies the type of medium on which the application file is stored. Enter T for tape or leave blank for disk. Disk includes any disk. Tape includes all types of tape.

```
 ----------------------------------------
|                                        |
|                                        |
|     GROUP HEADER 2                     |
|                                        |
|RECORDING.MODE: ,A,B              [ ]   |
|LABEL.TYPE: ,A,U                  [ ]   |
|DATE.FORMAT: ,E,U,I,J             [ ]   |
|SIGN.CONVENTION: ,1,2,3           [ ]   |
|JOURNAL: ,J                       [ ]   |
|JOURNAL.INPUT.REC.NO              [   ] |
|JOURNAL.OUTPUT.REC.NO             [   ] |
|                                    [ ] |
 ----------------------------------------
```

Recording Mode

Set this value only if Tape is specified for Medium. It refers to the representation of the file data as it goes out to tape. Enter A for ASCII, B for BCL, and leave blank for the default of EBCDIC.

Label Type

This value is the label type to be used for the application file, but is required only for tape files. Enter A for ANSI label, U for unlabelled, and leave blank for Burroughs standard label.

Date Format

This option determines the format of the date assumed for all date check fields in formats in this group. Enter U for USA format (MMDDYY), E for European format (DDMMYY), I for International format (YYMMDD), J for Julian format (YYDDD), and

leave blank for the system default date type, which is set in the standard system configuration as USA format.

Sign Convention

Sign convention controls the position of the sign in all signed numeric fields which are created using formats in this group. It affects only the application file. Enter 1 for least significant position, 2 for most significant position overpunch, 3 for least significant position overpunch, and leave blank for the default which is most significant position.

Journal

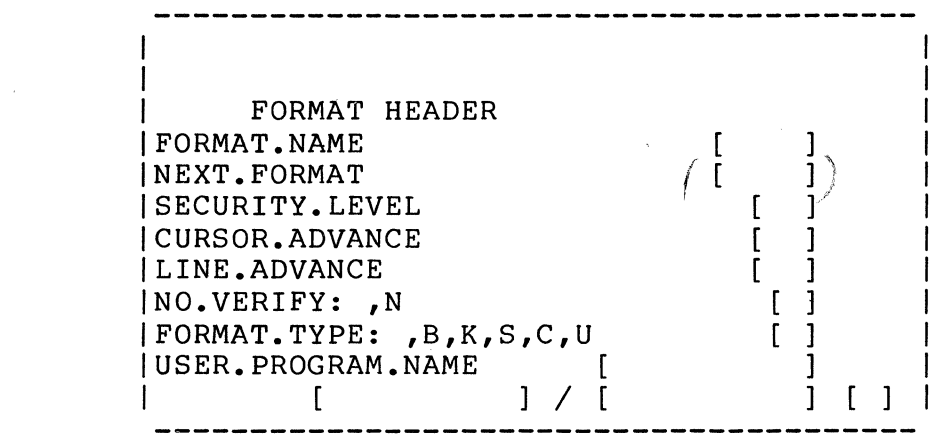
This option must be set if a journal is required for formats in this group. Enter J for journal; otherwise leave blank.

Journal Input Record Numbers and Journal Output Record Numbers

These numbers apply only if the journal option is set. These two options provide for record numbers to be printed on each line of the journal. If there is no journal or record numbers are not to be printed, leave blank; otherwise enter a number from 1 through 127 to specify the print column. Note that each record number requires six digits; ensure that the input and output record numbers are sufficiently spaced so as not to overlap.

FORMAT HEADER DATA

Format header data determines which options are not specific to individual fields of the screen format.



Format Name

This name identifies the format. Enter a maximum of four characters. They may be alphanumeric.

Next Format

This name identifies the logical successor or the format that will normally follow this format. Enter a maximum of four characters, which may be alphanumeric, or leave blank if there is no successor.

Security Level

This value specifies the security level of the format. An operator must have a security level equal to or greater than this number to use the format. Enter a number from Ø through 99. The default is 5Ø.

Cursor Advance

This option allows the cursor to be advanced automatically from the start of the format during data entry. It specifies the number of fields that will be skipped or tabbed over. Enter a number from Ø through 15. The default is Ø.

Line Advance

Line Advance is the number of blank lines left between the control line and and the first field of the format. Enter a number from Ø through 15. The default is Ø.

No Verify

This option provides for data which is not to be verified; if the option is set, records are automatically marked as "verified" when they are entered and cannot be verified in Verify mode. Enter N for no verify; otherwise leave blank.

Format Type

This option must be set if this is a batch header format to be used for batch total checks. Enter B for a batch header format. It is also used to specify format type if this is an inquiry format. Enter K for key data format, S for supply data format, C for check data format, or U for supply-and-check format.

User Program Name

This is the name of the user program that handles this format; it is applicable only to inquiry formats. A pack name, family name, and file name may be specified and, if an inquiry format type has been specified, this option is mandatory. This option must be left blank if the format type is blank.

FIELD DATA

Each field of the format must be specified. Use this first screen format to specify display options.

The Field Screen Layout/Audit and Output Specifications Form, contained at the end of this appendix, presents the same information.

```
 ----------------------------------------
|                                        |
|                                        |
|     FIELD DETAILS 1                    |
|                                        |
|SEQUENCE.NUMBER              [   ]      |
|FLD.NAME [                          ]   |
|FIELD.LENGTH                [   ]       |
|SPACES.BEFORE/AFTER.DESC     [  ] [  ]  |
|LINES.AFTER.DESCRIPTION      [  ]       |
|HIGHLIGHT: ,B,U,R,S          [ ]        |
|DUPLICATE.IN: ,D             [ ]        |
|VERIFY.METHOD: ,D,N          [ ]   [ ]  |
 ----------------------------------------
```

Field Sequence Number

This number, a number from 1 through 999, identifies the field. ODESY provides a default sequence number, beginning at 10 and incremented by 10 for each field.

Field Name

This name is displayed on the screen during data entry and may be printed in the journal. Enter a maximum of 28 characters. It is always truncated by omitting spaces to the right.

Field Length

This number refers to the length of the field. During data entry a field of this length will be displayed on the screen enclosed in a pair of field delimiters. For a name-only field leave blank; otherwise enter a number from 1 through 160. The default is 0.

Space Advance Before

Space Advance Before is the number of blank characters before the field name during data entry. Enter a number from 0 through 99. The default is 0.

Space Advance After

This value determines the number of blank characters between the field name and leftmost field delimiter during data enry. For name-only fields, enter a number from 0 through 99; otherwise enter a number from 1 through 99. The default is 1. (Note that when specifying a highlight option of secure video, two spaces will be required after the field name. This is to provide an additional space for a blink character in case of an error during data entry. This prevents secured data from being exposed.)

Line Advance After

This option specifies the number of lines to be advanced after the rightmost field delimiter during data entry. Enter a number from 0 through 15. The default is 0.

Highlight

Highlight applies only to the TD 730 and TD 830. If this option is set, the field will be highlighted. Enter B for bright video, U for underline video, R for reverse video, S for secure video; otherwise leave blank. All highlighting features are available on the TD 830, but only secure video applies to the TD 730.

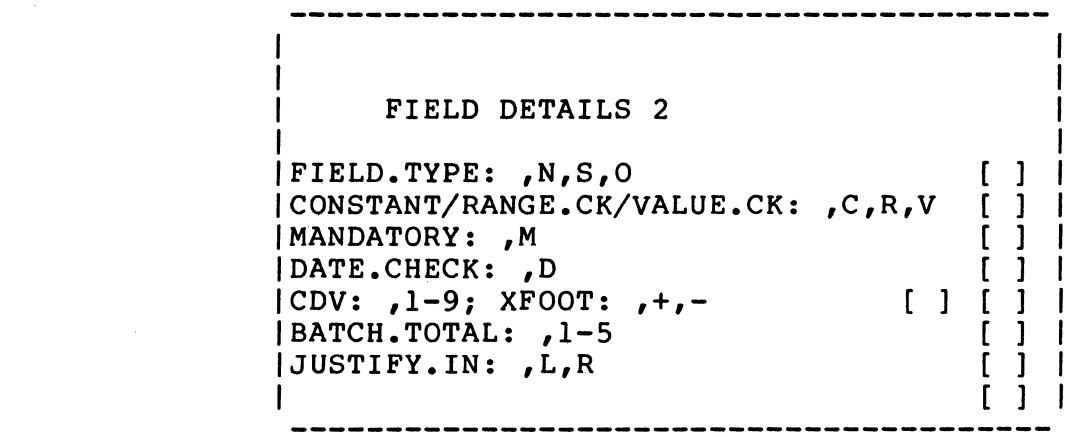
Duplicate In

This option provides for fields to be duplicated on the screen from record to record. Enter D for duplication; otherwise leave blank.

Verify Method

This option allows data within a field to be verified in three ways. (Leave blank for rekey verification, which requires that the data be re-entered manually.) (D for display verify causes data to be displayed on the screen during verification. For display verify, the cursor will still tab through the data field.) (N for no verify causes data to be displayed on the screen during verification and also makes the field transmittable protected. If you choose this method, the cursor tabs over the field and the field data cannot be changed during verification.)

Use this second screen format to specify audit checks. This screen format will not appear if the field length is zero.



Field Type

This option indicates whether the field is output-only or numeric. If it is output-only it does not appear on the screen. Output-only fields are always alphanumeric. If it is numeric a numeric check is performed. Enter O for an output-only field, N for an unsigned numeric field, S for a signed numeric field, and leave blank for an alphanumeric field. The maximum field length for an unsigned numeric field is 15 and for a signed numeric field it is 16.

Inserted Constant/Range Check/Value Check

Set this option if one of the above features is required. Range check constants can be applied only to numeric fields. Enter C for an inserted constant, R for a range check constant, V for a value check constant; otherwise leave blank. The maximum field length for a field with an inserted constant or a value check constant is 28; if it is numeric the lower limit of 15 or 16 applies.

Mandatory Check

Set this option if the field is mandatory, meaning that it may not be blank. Enter M for mandatory check; otherwise leave blank.

Date Check

Date Check applies only to unsigned numeric fields of length 5 for Julian dates or length 6 for other dates and must be set if the field is to be checked as a date. The date type option indicates the order of day, month, and year. Enter D for a date check; otherwise leave blank.

Check Digit Verification

Check digit verification applies only to unsigned numeric fields and must be set if a check digit verification scheme is to be applied to this field. You may define a maximum of nine different check digit verification schemes. Enter a number from 1 through 9 for check digit verification; otherwise leave blank.

Crossfoot Check

These options apply only to numeric fields and must be set if the crossfoot registers are used for subtotalling. There is one crossfoot register and each field may be added to or subtracted from the register. For each option, enter a plus or minus sign if crossfooting is required for the field; otherwise leave blank.

Batch Total Check

These options apply only to numeric fields and must be set if the batch totalling facilities are used. There are five batch total registers and each field, depending on its sign, may be added to or subtracted from one of the five. For each option enter a number from 1 through 5 if batch totalling is required for the field; otherwise leave blank.

Justification Check

Set this option if the field is to be checked for right or left justification. Enter R for right justification, L for left justification; otherwise leave blank.

Use this third screen format to specify output and journal options.

```
 ----------------------------------------
|                                        |
|                                        |
|     FIELD DETAILS 3                    |
|                                        |
|OUTPUT.POSITION                [   ]    |
|WRITE.AFTER: ,W,C,S              [ ]    |
|DUPLICATE.OUT: ,D,C              [ ]    |
|JUSTIFY.OUT: ,L,R; PACKED: ,P,H [ ] [ ] |
|BLANK.FILL: ,B; SIGN: ,+,-       [ ] [ ] |
|NAME.COLUMN                    [   ]    |
|DATA.COLUMN                    [   ]    |
|PRINT.AFTER: ,P,S,C              [ ] [ ] |
 ----------------------------------------
```

Output Position

This value indicates the position in the application file where the field is to be placed. If the field is to be output, enter a number from 1 through the record size. If the field is not to

be output, leave blank. The output position plus the field length may not be greater than the record size.

Write After

Write After controls the writing of records to the output file. Enter W for write-only, C for write-and-clear, S for save; otherwise leave blank.

Duplicate Out

This option is used in conjunction with the write-after option to duplicate fields in records of the application file. A chained field, unlike a duplicate-out field which may not be altered during data entry until a new format appears, duplicates the value contained within it until a new value is entered in the next chained field of the same format. Enter D for duplication, C for chained field; otherwise leave blank.

Justify Out

Use this option to right justify or left justify the field before it is written to the application file. Enter R for right justification, L for left justification; otherwise leave blank.

Packed

This option applies only to numeric fields. If this is a packed numeric (computational) field where each digit is stored as four bits rather than as eight bits, set this option. The output position option is specified in units of eight bits, but this option allows packed numeric fields to begin at either the usual byte boundary or four bits later at a half-byte boundary. Enter P for packed numeric output, H for packed numeric output with half-byte start position; otherwise leave blank.

Blank Fill

This option applies only to numeric fields. With the default, zero fill, blanks are replaced by zeros in numeric fields. Enter B for blank fill; otherwise leave blank.

Name Column

Name Column applies only if the journal option is set and refers to the position in the journal where the field name is to be printed. Enter a number from 1 through 132 if the field name is to be printed; otherwise leave blank.

Data Column

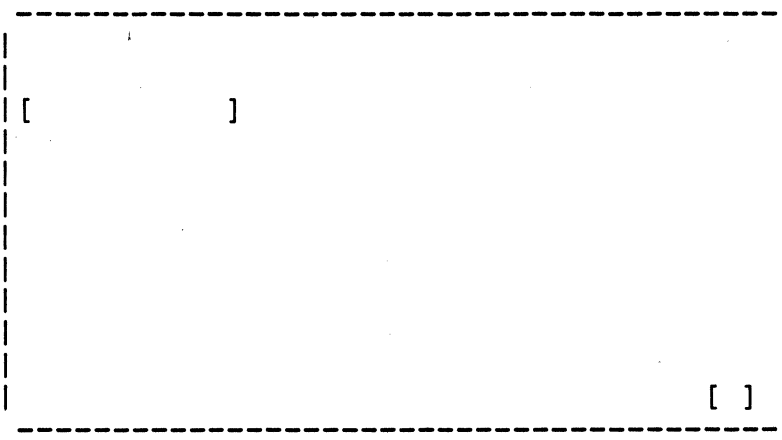
This value applies only if the journal option is set and indicates the position in the journal where the field is to be printed. Enter a number from 1 through 132 if the field is to be printed, or leave blank if it is not to be printed.

Print After

This option applies only if the journal option is set and controls the printing of journal lines. Enter P for print only, S for save, C for print-and-clear; otherwise leave blank.

INSERTED CONSTANT

This screen format appears automatically if the field has an inserted constant.

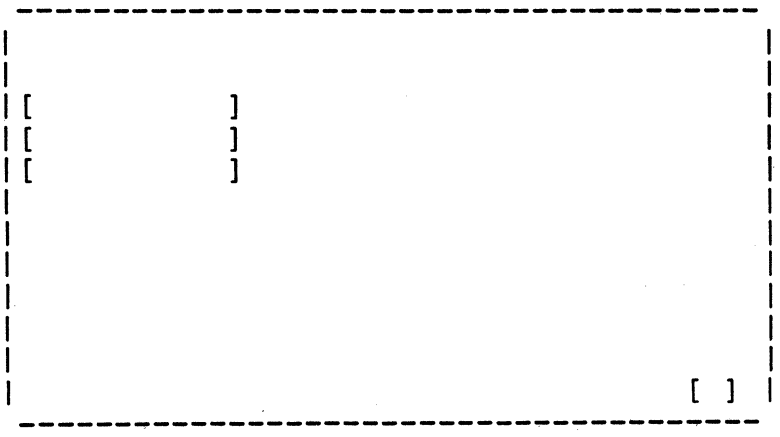


Inserted Constant

Enter a 10-character constant which satisfies the audit checks specified for the field.

RANGE CHECK CONSTANTS

This screen format appears automatically if the field has a range check constant.



First Constant

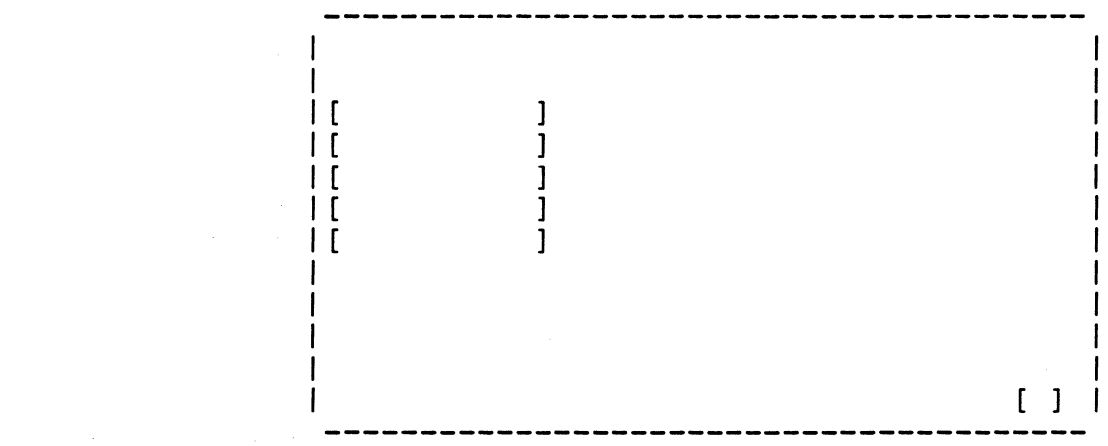
This value is the default for the field. Enter a 10-digit number or leave blank. The number may be signed if the field type is S.

Second and Third Constants

These numbers are the lower and upper limits of the range check. For each constant enter a 10-digit number. The number may be signed if the field type is S.

VALUE CHECK CONSTANTS

This screen format appears automatically if the field has a value check constant.



First Constant

This value indicates the default for the field and is used as the first value check constant. Enter a 10-character or 10-digit constant which satisfies the audit checks specified for the field, or leave blank.

Other Constants

You may enter as many value check constants as the limits of the system (see FORMAINT and EXTRACT configuration data) will allow. If five value check constants are entered, the format is displayed again. The value check list is terminated by a blank constant. Constants must satisfy other audit specifications for the field.

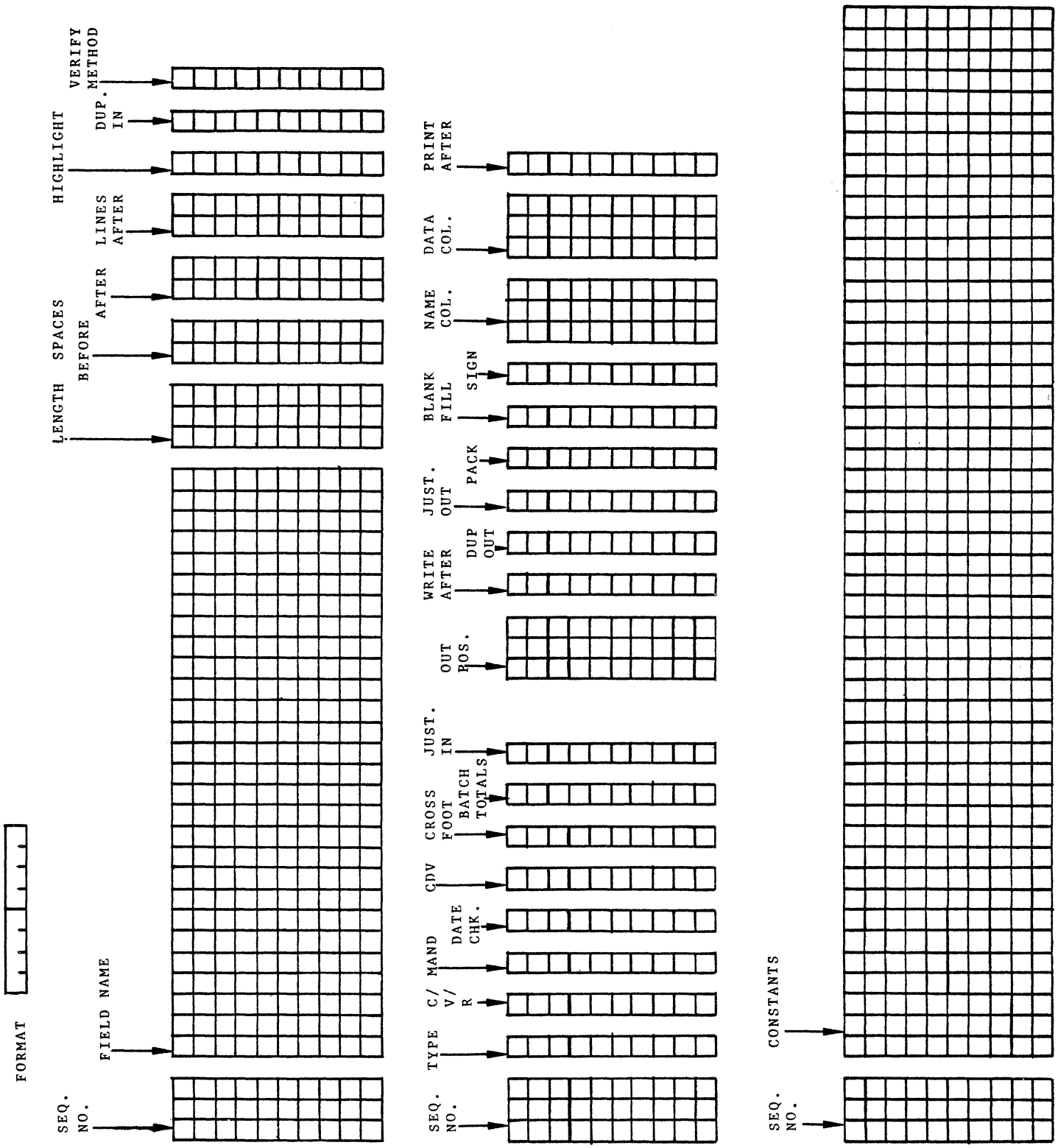


Figure 9. Field Screen Layout/Audit and Output Specifications Form

APPENDIX C. CHECK DIGIT VERIFICATION SCHEMES

Check digit verification is a means of checking or verifying certain numeric data, such as account numbers, through a series of calculations. Check digit verification uses self-checking numbers made up of digits combined in a particular way to produce a fixed result. The self-checking number, known as the check digit, is derived from an ordinary number by adding an extra digit.

For example, convert the account number 12345 to a self-checking number. The check digit calculation is performed on these five digits. In this case, the check digit is 9, so the complete number is 123459. The number is verified by repeating the calculation on the first five digits. For instance, if the operator enters 124359 (interchange of 3 and 4) or 123469 (entry of 6 instead of 5), the check digit is no longer valid.

The most basic check digit scheme is to add the digits together and subtract the total from a multiple of 10. Assuming random errors, this scheme detects nine of 10 mistakes by the operator. However, errors are not completely random. A common error, which this simple scheme does not detect, is to interchange two digits. Most of the common schemes give each digit a different weight, depending on its position in the number. This enables the interchange of digits to be detected.

You may define a maximum of nine check digit verification schemes, with a choice of:

a. Modulus.

b. Weights (or products).

c. Remainder.

d. Complemented or not complemented.

e. Calculation type (allows individual products to be added).

The most common check digit verification schemes are 1, 2, and 3, as follows, defined in the standard system configuration:

a. Burroughs Modulus 10 and IBM Modulus 10.

Modulus	10
Weights	2, 1, 2, 1, 2, 1, ...
Remainder	0
Calculation Type	"Add"

b. IBM Modulus 11.

Modulus	11
Weights	2, 3, 4, 5, 6, 7, 2, 3, ...
Remainder	Ø

c. Burroughs Modulus 11.

Modulus	11
Weights	7, 3, 1, 7, 3, 1, ...
Remainder	1

To add schemes or replace the standard schemes, enter check digit scheme parameters. (Refer to Section 4 and Appendix B.)

ODESY uses the following method to evaluate a check digit. This example shows a series of seven steps and may be regarded as a formula for verifying the check digit. The calculations are illustrated according to the Burroughs Modulus 11 scheme. The "add" and "complemented" options, not used in this scheme, are illustrated in principle.

a. Multiply each digit of the number by the corresponding weight to get a set of "products."

For example, check the number 123459 using the Burroughs Modulus 11 scheme. The basic number is 12345 and the check digit is 9. The Modulus 11 scheme has weights 7, 3, and 1. The first weight is applied to the least significant digit:

Digits	1	2	3	4	5
Weights	3	7	1	3	7
Products	3	14	3	12	35

b. If the calculation type is "add," reduce each product to a single digit by adding the individual digits together.

The Burroughs Modulus 11 scheme does not use this option; however, as an example, the product 35 would be reduced to 3 + 5 = 8, the product 12 to 1 + 2 = 3, and the product 14 to 1 + 4 = 5. Single digit products remain unaltered.

c. Add the products or reduced products together.

In the example above the result is:

3 + 14 + 3 + 12 + 35 = 67

d. Add the "remainder," a fixed constant, to the result of the previous step.

   In the example above the remainder is 1, giving a result of 68.

e. Subtract the result of the previous step from the next highest multiple of the modulus.

   In the example above the next highest multiple of 11 is 77, giving a result of 9.

f. If the check digit is to be complemented, subtract the result of the previous step from the modulus.

   The Burroughs Modulus 11 scheme does not use this option, so the result, 9, is unchanged. If it did use the complemented option, the result would be 2.

g. The check digit is one of the following:

   1) If the result of the previous step is the same as the modulus, the check digit is Ø.

   2) If the result of the previous step is greater than 1Ø, the check digit is the result minus 1Ø.

   3) The check digit is the result of the previous step.

   In the example above the check digit is 9, which agrees with the value entered.

ODESY also offers the option of entering products rather than weights. This option allows complex schemes to be defined. ODESY employs products in its check digit verification tables because they are easier to use. If you enter products, they are placed directly in the tables, but if you enter weights they must be converted into products.

ODESY uses a table access method and the tables contain modified products. The table for the Burroughs Modulus 11 scheme contains three entries with 1Ø products in each entry, as shown:

	PØ	P1	P2	P3	P4	P5	P6	P7	P8	P9
First = 7	ØØ	Ø7	Ø3	1Ø	Ø6	Ø2	Ø9	Ø5	Ø1	Ø8
Second = 3	ØØ	Ø3	Ø6	Ø9	Ø1	Ø4	Ø7	1Ø	Ø2	Ø5
Third = 1	ØØ	Ø1	Ø2	Ø3	Ø4	Ø5	Ø6	Ø7	Ø8	Ø9

The products are the result of multiplying the weight by Ø, 1, 2, 3, 4, 5, 6, 7, 8, and 9, and then reducing each result to a value less than the modulus.

In understanding how ODESY evaluates a check digit, consider the number 12345. ODESY takes P5 from the first entry (2), P4 from the second entry (1), P3 from the third entry (3), P2 from the first entry (3), and P1 from the second entry (3). These are added together totaling 12. The remainder of 1 is added totaling 13. This is subtracted from 22 (twice the modulus) producing a check digit of 9.

If you add products to the check digit verification tables, the calculation type must be set to "enter products," and there must be 1Ø products (that is 2Ø digits) for each weight. Therefore, instead of entering the weights 731, you must enter the products ØØØ7Ø31ØØ6Ø2Ø9Ø5Ø1Ø8, and so on.

APPENDIX D. FORMAT MAINTENANCE PROGRAM MESSAGES

This appendix contains a list of error and information messages pertaining to the Format Maintenance Program. An explanation is included with the number and standard text of each message. Some messages, listed here individually, comprise the first or second part of the final message which actually appears on the screen.

The text of these messages can be modified through the system parameters input formats used with the File Maintenance Program. The length number, included at the end of each explanation, is the maximum number of characters which may be altered.

NUMBER	MESSAGE	EXPLANATION
101	GROUP	This appears in the first line of control information for the Group Templates. Length 7.
102	FORMAT	This appears in the first line of control information for the Format Template. Length 7.
103	FIELD	This appears in the first line of control information for the Field Templates. Length 7.
104	I-CONS	This appears in the first line of control information for the Inserted Constant Template. Length 7.
105	R-CONS	This appears in the first line of control information for the Range Constants Template. Length 7.
106	V-CONS	This appears in the first line of control information for the Value Constants Template. Length 7.
107	INSERT	This appears in the first line of control information during insertion of format data. Length 7.
108	LIST	This appears in the first line of control information during

		listing of format data. Length 7.
109	AMEND	This appears in the first line of control information during amendment of format data. Length 7.
110	DISPLAY	This appears in the first line of control information during format display. Length 7.
111	REMOVE	This is the first part of the reply to a REMOVE command. The second part is message 130. Length 7.
112	DUMP	This is the first part of the reply to a DUMP command. The second part is message 130. Length 7.
113	LOAD	This is the first part of the reply to a LOAD command. The second part is message 130. Length 7.
114	PRINT	This is the first part of the reply to a PRINT command. The second part is message 130. Length 7.
116	WORKAREA	This is the first part of the reply to a PRINT WORKAREA command. The second part is message 127. Length 8.
117	ALL	This is the first part of the reply to a DUMP, LOAD, or PRINT command without group or format specifications. The second part is either message 125, 126, or 127. Length 8.
118	INSERTED	This is the second part of the reply to insertion of a field. The first part is message 103. Length 15.
119	AMENDED	This is the second part of the reply to amendment of a group, format, or field. The first part is either message 101, 102,

		or 103. Length 15.
120	DELETED	This is the second part of the reply to deletion of a group, format, or field. The first part is either message 101, 102, or 103. Length 15.
121	NOT PRESENT	This is the second part of the reply to an AMEND, COPY, DELETE, LIST, or MOVE command when the group, format, or field is not in the workarea. The first part is either message 101, 102, or 103. Length 15.
122	DUPLICATE FIELD	This is the second part of the reply to an INSERT <field> command when the field sequence number entered already exists in the workarea. The first part is message 103. Length 15.
123	SAVED	This is the second part of the reply to a SAVE command. The first part is the group name and format name. Length 15.
124	REMOVED	This is the second part of the reply to a REMOVE command. The first part is the group name and format name. Length 15.
125	DUMPED	This is the second part of the reply to a DUMP command. The first part is the group name and format name. Length 15.
126	LOADED	This is the second part of the reply to a LOAD command. The first part is the group name and format name. Length 15.
127	PRINTED	This is the second part of the reply to a PRINT command. The first part is the group name and format name. Length 15.
128	NOW AVAILABLE	This is the second part of the reply to a GET command. The first part is the group name and format name. Length 15.

129	NOT IN FILE	This is the second part of the reply to a COPY, DUMP, GET, PRINT, or REMOVE command when the group or format names cannot be found in the Formats file. The first part is the group name and format name. Length 15.
130	STARTED	This is the second part of the initial response to a DUMP, LOAD, PRINT, or REMOVE command. The first part is either message 111, 112, 113, or 114. Length 15.
131	DONE	A COPY, MOVE, or RESEQUENCE command has been accomplished successfully. Length 15.
132	NOT RECOGNIZED	The last command was entered incorrectly. Length 30.
133	NOT BUSY	The last input was data rather than a command, but the operator is not inserting, listing, or amending. Length 30.
134	SAVE OR DELETE	Save or delete the workarea before entering a BYE or INSERT command. Length 30.
135	MESSAGE ZIPPED TO MCP	This is the reply to any input preceded by a question mark. Length 30.
136	START OF SESSION	This is the reply to a HELLO command with a valid operator number and password. Length 30.
137	END OF SESSION	This is the reply to a BYE or command. Length 30.
138	ENTER OPERATOR/PASSWORD	No operator is logged in. Length 30.
139	INVALID OPERATOR/ PASSWORD	This is the reply to a HELLO command with an invalid operator number or password. Length 30.
140	ALREADY LOGGED IN	This is the reply to a HELLO command when an operator is already logged in. Length 30.

141	TOO MANY FIELDS FOR FORMAT	This is the reply to an INSERT <field> command when the maximum number of workarea fields has been reached (normally 63 fields). Length 30.
142	GROUP INDEX IS FULL	This is the reply to a LOAD or SAVE command when there are 196 groups in the Formats file. Length 30.
143	CONSTANT TABLE OVERFLOW	This is the reply to the entry of format data when there are too many constants for the workarea. Length 30.
144	NO FORMATS HAVE BEEN LOADED	The format or formats specified in the LOAD command were not found in the Dump file. Length 30.
145	FILE IS INCOMPATIBLE	The Dump file specified in the DUMP or LOAD command does not contain records of length 60 bytes, blocked 3. Length 30.
146	FILE IS ALREADY IN USE	The Dump file specified in the DUMP or LOAD command is in use by another program. Length 30.
147	FILE NOT ON DISK	The Dump file specified in the LOAD command is not on disk. Length 30.
148	MESSAGE SENT TO CONSOLE	The message specified in the SS command has been sent to the ODT. Length 30.
149	NOT AN ODESY STATION	The operator has attempted to log in at a station not defined in the ODESY System file. Length 30.
150	OPERATOR LOGGED IN ELSEWHERE	Only one operator may be logged in to FORMAINT at a time. Length 30.
151	SEQUENCE NUMBER ERROR	Sequence numbers in a COPY, MOVE, or RESEQUENCE command have been entered incorrectly. Length 30.

152	SEQUENCE NUMBERS WILL NOT FIT	A COPY, MOVE, or RESEQUENCE command has been entered, but the renumbered fields will not fit in the new location. Length 30.
153	FORMATS FILE IS IN USE	A LOAD, REMOVE, or SAVE command has been entered, but the Formats file is in use by EDIT or EXTRACT. Length 30.
154	WARNING, 0 VALUE IN WRITE.AFTER	A SAVE command has been entered and the write-after option for the last field in the format was left blank. The format is saved regardless of the warning. Length 30.
155	FORMAT TOO LARGE TO DISPLAY	A DISPLAY command has been entered, but the format is too large to fit on the screen. Length 30.